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Examining Relationships Between Sub-Components of Reading in Xitsonga

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***Abstract*—Reading is developed over time and involves the interaction of both simple and complex skills characterised by a hierarchical sequence of foundational reading skills. However, research has shown that children who do not acquire mastery of foundational reading skills have limited chances of acquiring reading success. This study examines the relations between sub-components of reading in Xitsonga and their impact on Grade 1 learners' reading ability. It also aims to identify which early reading skills predict later reading accomplishment. Data in this study was obtained from 75 Grade 1 learners in the Limpopo Province. The early-grade reading assessment tool adapted to Xitsonga was used to test the learners' foundational reading skills: phonological and phonemic awareness, letter-sound knowledge, word reading, oral reading fluency and reading comprehension skills. The results present a compelling relationship between the subcomponents of reading and show that deficits in the development of foundational reading skills negatively impact learners' ability to read. Regression analysis showed that oral reading fluency was the only significant predictor of reading comprehension. Hence, there is a need for reading to be taught and learned consciously in alphabetic languages to help learners develop their early reading skills, which play important roles in the acquisition of reading.**

***Index Terms*—Xitsonga, foundational reading skills, sub-components of reading, early grade reading**

I. Introduction

Successful reading develops from the relationship of five basic components: phonological and phonemic awareness (PA), letter-sound knowledge (LSK), word reading (WR), oral reading fluency (ORF) and reading comprehension (RC). Spaull et al. (2020) also demonstrated robust relationships between various reading skills, from simple to more complex ones. Although the five reading measures contribute immensely to reading achievement, they do not provide children with equal opportunities for developing reading abilities. Some (e.g., PA, LSK, WR, ORF) often referred to as foundational skills are necessary but not sufficient for reading success, while others, as the relationship of the five components of reading changes over time, expose readers to more complex skills which help them transition from emergent to conventional reading. Given this interrelationship, it is vital that children master their foundational reading skills to help them develop the ability to read for meaning. However, evidence highlights low levels of comprehension among learners reading in African languages (Probert, 2019; Spaull et al., 2020; Khosa, 2023). There are several factors contributing to the learners' poor reading performance, and these include, inter alia, the learners' inability to master their foundational/early reading skills (Lyytinen et al., 2019). Fuchs and Fuchs (1999) caution that failing to master early reading skills is associated with serious problems ahead.

There is limited research on the relationship between subcomponents of reading in Xitsonga on Grade 1 learners. Spaull et al. (2020) in their study of analysing the sub-components of reading across the three African languages (Northern Sotho, Xitsonga and IsiZulu) revealed strong relations between LSK and WR, WR and ORF, and ORF and RC in Xitsonga, focusing on Grade 3 learners. The data in the current paper has been extracted from the doctoral thesis on early reading development in Xitsonga (Khosa, 2021). Hence, this paper is meant to examine the relationship between different reading components in Xitsonga and their impact on the Grade 1 learners' ability to develop reading achievement. It also aims to identify which early reading skills predict later reading accomplishment. To address the said aims, the following research questions are posed:

- How are the different reading components in Xitsonga interrelated?
- Which early reading skills in Term 1 predict reading success at the end of Grade 1 in Xitsonga?
- How does the relation between different reading components in Xitsonga impact the Grade 1 learners' ability to develop reading achievement?

This paper first presents the interactive reading model to make broader generalisations. This is followed by a discussion of the five basic components of reading and their interrelationships. Next, the orthographic system of Xitsonga language is presented. Thereafter, this is followed by describing the methodology used for collecting and analysing data, presentation and discussion of the results. Finally, the concluding thoughts are given.

A. Interactive Model of Reading

This study draws on the interactive model of reading proposed by Rumelhart (1977). The model combines the bottom-up (foundational level of reading) and top-down (higher level of reading) reading models (see Figure 1).

Rumelhart used his interactive reading model to demonstrate the weaknesses of the bottom-up and top-down models which respectively proceed only in one direction, while, for the interactive model, each level communicates with those immediately above and below it (Rumelhart & McClelland, 1981). The interactive model has the advantage of providing young readers with opportunities to develop foundational reading skills such as letter-sound knowledge which helps them decode familiar and unfamiliar words accurately to comprehend what they are reading. The interactive approach is relevant for this study on the basis of ensuring that the process of reading (involving bottom-up and top-down approaches) happens reciprocally. This simply means that although foundational reading skills are necessary but not sufficient for the whole reading programme, proficiency and mastery of these skills set learners on track for reading development (Paige et al., 2018).

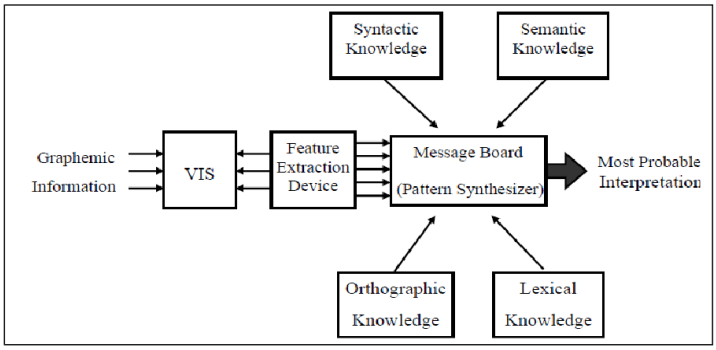

Figure 1. Interactive Model of Reading (Source: Rumelhart, 1977, p. 732)

Figure 1 clearly describes Rumelhart's interactive reading model which happens on three levels: between lower-level and higher-level skills, between bottom-up and top-down processes, and between the background knowledge in the text and the background of the reader. According to Rumelhart, the reader may employ a bottom-up process to comprehend a text and then switch to a top-down process to execute a higher-level interpretation of the meaning of the text (Prasad, 2016).

B. Five Basic Components of Reading

Reading develops from the following five different components, which complement each other for reading success:

(a). Phonological and Phonemic Awareness

Phonology deals with sounds in a language. Yet et al. (1978; in Alduais, 2015) defines it as "the science of speech sounds and sound patterns" (p. 159). These sounds are reflected in a stream of speech, which can be broken down into sentences, phrases, words, syllables, and phonemes. Phonemes are the smallest units in language. If one phoneme is replaced with another in a word, it changes the meaning of the word, for example, Xitsonga words, such as *vana* (children), *tana* (come), *fana* (similar). Different languages have different inventories of phonemes, and children acquire these from an early age when they acquire language, as well as knowledge about the permissible sequences of phonemes within words; for example, *nkombe* (wooden spoon) is permissible in Xitsonga but not **nkomte* or **bnkombe*). The PA skill is important for learning to read any alphabetic orthography (Melby-Lervåg et al., 2012). Its critical role is evidenced by permitting phonological recoding, commonly known as *decoding* (i.e., learning and applying sound-symbol mappings to access words in a spoken language) (Goldenberg et al., 2014). A study conducted two decades ago with Grade 2 learners at an English medium school in South Africa found a strong relationship between phonological abilities and performance on reading and spelling measures (Pijper, 2003). Several studies have also revealed significant contributions of PA skills on reading development (Wilsenach, 2013; Gellert & Elbro, 2017). Clayton et al. (2019) examined the predictive relationship between a range of phonological language skills and early reading development of 191 Grade 1 learners in Greater London. Their findings showed that phoneme awareness, letter-sound knowledge and alphanumeric Rapid Automatized Naming (RAN) were all strong independent predictors of reading development.

(b). Letter-Sound Knowledge

Letter-sound knowledge refers to the mapping of sounds to written codes, such as letters and blending them (Khosa, 2021). It is "the conscious, concentrated study of the relationship between sounds and symbols to learn to read and spell words" (Savage, 2007, p. 7). Research shows that children can develop knowledge of letters early, even before school, if they have frequent exposure to a print-rich environment. Letter-sound knowledge enables children to decode known and unknown words. Children's knowledge of letter sounds is measured by counting the number of letters read correctly from a chart within a given time, such as a minute.

Several studies demonstrated that letter-sound knowledge helps develop phonological awareness (Foy & Mann, 2006; Kim et al., 2010; Mášková, 2015). Hulme et al. (2012) also revealed that a reading intervention that included phonological awareness/phonics produced significant improvements in letter-sound knowledge, phoneme awareness,

word reading and spelling. Letter-sound knowledge is critical for word decoding. Several studies have shown the importance of letter-sound knowledge for decoding words, which is important for reading comprehension (Chepchumba et al., 2018; Clayton et al., 2019; Sigmundsson et al., 2020). Chepchumba et al. (2018) examined the influence of learners' ability to correspond letters to their correct sounds on the performance of English reading in Grade 1 in Keiyo Sub County. Their findings revealed that learners need to be taught letter-sound correspondences to improve their ability to read English. Another study of 5 to 6-year-old children learning to read in Norway showed that letter-sound knowledge was associated with the ability to read (Sigmundsson et al., 2020). Apart from directly contributing to the development of phonological awareness and speed and accuracy in word reading, letter-sound knowledge also maps to successful oral reading fluency. This was demonstrated in a longitudinal study of 16,400 learners in three Nguni languages (isiZulu, isiXhosa and isiSwati) in South Africa, where strong letter-sound knowledge was found to be critical for oral reading fluency. Based on this finding, 40 letters correct per minute (lcpm) was recommended as a benchmark for the Nguni young readers by the end of Grade 1 (Ardington et al., 2020).

(c). Word Reading

Word reading is the ability to read isolated words quickly and accurately and to recognise shorter high-frequency words without having to sound them out (Spaull et al., 2020). For example, shorter high-frequency words in Xitsonga include *hi* (we), *le* (there), *wa* (of), and *na* (and). For beginning readers to read these words accurately, they require skills, such as the ability to break down known or unknown words into letters, phonemes, syllables, and morphemes that make up words. Word reading is assessed in terms of the number of words read correctly per minute. When children struggle with word reading, early grade reading assessment may reveal poor language skills, lack of vocabulary knowledge, or poor decoding and spelling ability (International Literacy Association, 2018).

Word reading is important in terms of providing beginner readers with regular practice in reading words in and out of context. It increases accuracy and speed in reading. This helps the readers free up attention to focus on the meaning of the text rather than laboriously sounding out words, letter by letter and sound by sound (Hayes & Flanigan, 2014; Pretorius et al., 2016). Although the ability to read words alone is not sufficient for successful reading (Nation & Snowling, 1998), research reiterates that it is not possible for fluent reading to take place without accurate and fast word reading (Roembke et al., 2019; Ardington et al., 2020). For example, a study that assessed the automaticity of middle-school learners in America with an accuracy-based measure found that automaticity significantly predicted reading fluency over and above knowledge of the relevant grapheme-phoneme mappings (Roembke et al., 2019). A local study investigating decoding skills underpinning reading comprehension across three agglutinating languages (Northern Sotho, Xitsonga, and isiZulu) from 785 Grade 3 learners showed that word reading was robustly related to oral reading fluency across the three African languages (Spaull et al., 2020). Much research has also demonstrated the effect of word reading on reading comprehension (Guldenoğlu et al., 2012; Cadime et al., 2016). This also applies to reading in an agglutinating language such as Turkish. For example, in a study on word processing and reading comprehension from skilled (n=26) and less skilled (n=23) Grade 2 learners in Turkey, involving the processing of isolated real word and pseudoword pairs as well as their reading comprehension skills, Guldenoğlu et al. (2012) found that word processing and reading comprehension skills correlate positively for both skilled and less skilled readers. Kim and Piper (2019), in their study of the relations between component skills of reading comprehension in three sub-Saharan African languages (Kiswahili, Kikamba and Lubukusu), also found that word reading was directly and positively related to reading comprehension.

(d). Oral Reading Fluency

Oral reading fluency refers to the ability to read accurately and fluently, with appropriate intonation and feeling, and paying attention to punctuation (Spaull et al., 2020). Fluency develops through practice and can be assessed in terms of *accuracy*, *speed* (rate) and *prosody*.

Accuracy refers to the ability to identify individual words correctly. Not being accurate can change the meaning of what is read. Accurate word reading is important because it enables readers to distinguish words from each other, e.g., *limp* from *limb*.

Speed refers to the ability to recognise and decode words effortlessly. Reading becomes automatic once readers master accuracy and increase their rate of reading according to their grade level. The speed at which reading occurs at grade level and the accuracy shown in recognising and decoding words reduces the reader's cognitive load so that the focus can be on comprehension. Reading below a certain rate (referred to as a *minimum* threshold) severely compromises reading comprehension. In their study, Ardington et al. (2020) found that by Grade 2, learners who read slower than 20 words correct per minute (wcpm) in the Nguni languages fell into a non-comprehension zone. By Grade 3, most Nguni readers should read at 35 wcpm (benchmark) or higher.

Prosody refers to reading with feeling and intonation, chunking up words or phrases together, and pausing in appropriate places (e.g., after a comma or full stop) (Department of Basic Education, 2019). Reading with prosody reflects language features such as punctuation and text features such as dialogue, sentence features, etc. Grade-level readers can use these features to help them understand what they are reading. Prosody extends across words – it reflects the natural rhythm of speech and is important in African languages due to their tonal characteristic. For example, Xitsonga words, *tiya* (to be strong) and *t ýa* (tea), are spelt the same but are pronounced with different tones according

to their meanings (*ì* with a low tone on the first vowel and *í* with a high tone on the second vowel). Because the assessment of prosody is more subjective, fluency is usually measured in terms of accuracy and rate. Studies have also shown that oral reading fluency is significantly related to comprehension in both home language (Àlvarez-Ca ñizo et al., 2015; Kim & Piper, 2019; Spaull et al., 2020) and English First Additional Language (EFAL) (Pretorius & Spaull, 2016). In a large-scale study of 4,697 Grade 5 EFAL learners in South Africa, the relationship between oral reading fluency and reading comprehension was found to be large and robust; reading an additional wcpm was associated with a 14%-point increase in comprehension score after controlling for all school-level variables and certain student-level variables such as age and gender (Pretorius & Spaull, 2016).

The close relationship between oral reading fluency and reading comprehension is further demonstrated in studies that have shown a bidirectional relationship between the two factors (Klauda & Guthrie, 2008; Kim, 2015; Veenendaal et al., 2016). For example, a study that examined the relationship of three levels of reading fluency (the word level, the syntactic unit and the whole passage) to reading comprehension of Grade 5 learners (*n*=278) in the United States found that reading fluency predicted growth in comprehension while comprehension predicted growth in fluency, suggesting bidirectional relations between the two reading skills (Klauda & Guthrie, 2008). In sum, a broad range of research has consistently shown that code-based skills contribute significantly to children's ability to recognise words, read fluently and understand what they read (Share & Stanovich, 1995; Castles et al., 2018).

(e). Reading Comprehension

Comprehension (i.e., reading for meaning) is what reading is all about (Pretorius & Murray, 2019). It involves the author (and his/her text) and the reader. The reader uses his/her decoding skills to read the author's words accurately and fluently and employs various comprehension strategies (e.g., background knowledge, making inferences, predicting, visualising, sequencing, monitoring comprehension, etc.) to construct meaning from what is read. Reading comprehension ability is unconstrained – it develops throughout life. Through the process of acquiring reading skills, children need to develop decoding skills and read words with increasing fluency so that they can start honing their comprehension skills. There are different levels of meaning in a text, where some are easier than others. These include literal, inferential, and critical understanding. Literal comprehension involves the understanding of information that is explicitly stated in the text. Inferential understanding of a text describes readers who make connections between elements in the text and integrate information in the text and in their heads. Critical understanding of a text is the level at which a reader can interpret or evaluate information of a text at a more abstract level of understanding, based on their own knowledge as well as information in the text. A theory of text comprehension attempts to explain how children build a memory representation, which happens in the form of mentally converting individual words and sentences into propositions and connecting them together through background knowledge or through the process of recalling previous experiences. Nevertheless, the ability to develop all the five basic components of reading mentioned above is determined by the level of orthographic knowledge acquired in a particular language.

C. The Orthographic System of Xitsonga Language

Xitsonga is recognised as one of the official languages in South Africa. More than 3 million people in South Africa, Mozambique, Swaziland, and Zimbabwe speak Xitsonga. Home language speakers of Xitsonga comprise 4.5% of South Africa's population (Statistics South Africa, 2011). Xitsonga uses a simple vowel system containing five monophthongs which include close, mid, and open vowels: a [a] e [ɛ] i [i] o [ɔ] u [u] (Janson, 2001). The mid-high front vowel is realised as /e/, for example, *xelexo* [ʃɛleʃɔ] (that one). The mid-high back vowel /o/ and the mid-low back vowel [ɔ] are written as /o/, for example, *nhloko [nłokɔ]* (head). The high front vowel /i/ is written as *i*, for example, *muti [muti]* (household), and the high back vowel /u/ as *u*, for example, *mbuti [mbuti]* (goat).

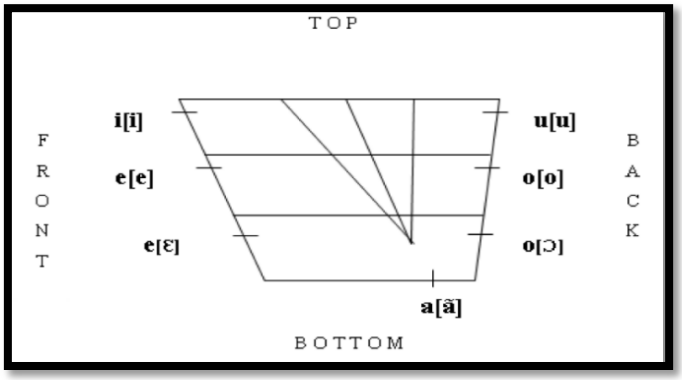

Figure 2. Xitsonga Vowels

Xitsonga phonology comprises very large and complex consonant systems. However, there is much debate around the classification of consonants as phonemes, for example, whether *-nd-* is counted as a single albeit complex consonant and hence represented by a digraph (i.e., two letters representing a single sound) or as a consonant sequence of *n* and *d*.

Janson (2001) claims that there are over 125 consonants in Xitsonga, both simple and complex, and each consonant is regarded as a phoneme. However, there are no minimal pairs to support Janson's classification of phonemes, but he indicates that the richness and complexity of the consonant system in Xitsonga warrant treating each consonant and consonant variation as individual segments. Table 1 below shows Janson's classification of simple phonemes in Xitsonga.

TABLE 1
XITSONGA CONSONANTS

	Bilabial	Labiodental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Glottal
Plosive	p b		T d				k g	
Nasal	m		n			ɲ	ŋ	
Trill			r					
Fricative	ß	f v	S z	ʃ ʒ	ʂ ʐ			h
Lateral Fricative			ɬ ɮ					
Approx			ɹ			j		
Lateral Approx			l					

Xitsonga also has 'whistled' sibilants like Shona, [sw/sv, tsw/tsv, dzw/dzv], referred to as labialised consonant clusters which are coarticulated with consonants /gw/, /lw/, /nw/. Xitsonga orthography contains singles /t/, digraphs /*ta*/, and large consonant codes such as trigraphs /*thl*/, 4-consonant sequences /*ntsh*/, and a few 5-consonant sequences /*ndzhw*/. Moreover, it also uses loan sounds from languages such as isiZulu, English, and Afrikaans.

Xitsonga makes use of the Latin alphabet. For example, the letter *x* from Portuguese orthography, which is pronounced [ʃ], occurs in words such as *xuxa* (while away time), *xikolo* (school), and *xilo* (thing) in Xitsonga. The spelling-sound correspondence in Xitsonga is transparent, which makes learning to read generally easier, as there is a one-to-one relationship between letters and sounds (graphemes and phonemes) (Ellis & Hooper, 2001). However, other factors can make learning the code a bit more challenging, such as the larger consonant code mentioned above. Tsonga also shares several cognates with Nguni languages, such as isiZulu. Examples are given below.

Tsonga	**Zulu**	**Gloss**
1. *-dyá*	*-dlá*	to eat
2. *ncɬá*	*Úmsɬa*	tail
3. *-bɔ́ha*	*-bɔ́pha*	to bind, tie
4. *nhlárhú*	*ńhlwathi*	python
5. *-rhándza*	*-thánda*	to love
6. *hahú*	*ĭphaphu*	lung
7. *havú*	*Íńkâwu*	monkey
8. *ntsumbula*	*úmdúmbulá*	cassava

Although Xitsonga and isiZulu share several cognates, Xitsonga has a mainly disjunctive orthography, while isiZulu has a conjunctive orthography. A disjunctive orthography means that some verbal elements are written separately from one another; for example, the sentence, *ndza famba* (I am leaving) in Xitsonga is written as two separate orthographic words, whereas in isiZulu the same sentence is conjunctively written as a single orthographic word *ngiyahamba*. In the conjunctive orthography of isiZulu, prefixes and suffixes are joined to word roots to form long orthographic words with complex morphological structures (De Schryver, 2010). Although there are some long words in Xitsonga, orthographically, Xitsonga written texts contain fewer long orthographic words compared to written Nguni texts.

II. RESEARCH METHODOLOGY

A. Background of the Study

Seventy-five Grade 1 learners' early reading data in Xitsonga were collected in two phases (Term 1, March and Term 3, September 2018) in Mopani district of Limpopo Province in South Africa. However, in Term 3, only 72 learners were assessed, bringing the attrition rate to 4%. The data presented in this article was drawn from the findings of a doctoral study that sought to examine 75 Grade 1s' early reading development in Xitsonga in five different schools. Of the five schools sampled for the study, four were quintile 2 (under-resourced) Schools B, C, D, and E, where Xitsonga home language is taught as the language of learning and teaching (LoLT) to learners whose mother tongue is Xitsonga, while one was a quintile 4 (better-resourced) School A that taught Xitsonga as the First Additional Language (FAL) which is taught to learners whose first language is not Xitsonga. These schools were sampled on the basis of

establishing performance outcome between Xitsonga as the LoLT in comparison to being taught as the FAL. Findings revealed significant differences between the two language levels in favour of the FAL (Khosa, 2023).

B. Reading Assessment Procedures

The reading assessment was administered to Grade 1 learners in Term 1 and again in Term 3. Learners were tested one-on-one in a quiet classroom for about 7 minutes. A good rapport was established by explaining the procedures of the assessment to the learners. Learners were given opportunities to practice before they could be assessed. Learners who could not read anything or got 6 items incorrectly had to stop and move to another subtask.

PA assessment: The PA chart included 13 items. This was an oral task, where the learner had to listen to the items said aloud to delete, substitute, or identify the sounds of each item. All the learners had opportunities to practice the items twice before they were assessed. One point was awarded for a correct response.

LSK assessment: The letter-sound chart included hundred and ten letters, ten per row. Learners practised two items before they were tested. They were asked to read the letter sounds across each row from left to right. Learners were timed for sixty seconds to sound as many letters as they could. While reading, letters that were read incorrectly were noted. After one minute had lapsed, the learner was instructed to stop reading, and a circle was placed around the last letter that was read. The letters attempted were recorded, and the total number of errors was subtracted, and a total of letters read correctly per minute was obtained. One point was assigned for each letter that sounded correct.

WR assessment: A chart containing approximately fifty words was used to test the learners' ability to read words that were out of context. Similar to administering the other subtasks, learners were given opportunities to practice two items before they could be tested. Learners had sixty seconds to read as many words as they could. Errors were noted while reading, and after a minute, the same scoring procedure as done above was used.

ORF assessment: Learners were instructed to read a passage of a story in one minute, and errors were noted while reading aloud. If they read slowly and seemed to be struggling, they were asked to stop reading. Learners were scored according to the number of words read correctly per minute.

ORC assessment: After reading two passages per minute, learners were asked to respond to the questions presented orally based on what they had read. The score awarded for reading comprehension was the number of correct answers given per item.

C. Grade 1 Assessment Instrument

The Grade 1 learners were tested using the Early Grade Reading Assessment (EGRA) tool, adapted to Xitsonga. The assessment tool comprised five foundational reading skills. Holistically, the assessment instrument comprised two sections. **Section A** included the learners' demographic information (e.g., gender, age, school name, etc.). These details were added to compare the learners' scores in different groups. **Section B** included the following five foundational literacy skills: PA (thirteen items), LSK (hundred and ten letters), WR (fifty words), ORF (two passages of fifty-seven and sixty words each), and ORC (five questions per passage, four literal and one inferential). Examples were given for practising purposes and to ensure the learners understood what was read. Learners were given sixty seconds to perform each of the three timed tasks (LSK, WR and ORF). The timed tasks were meant to determine to what extent the learners' foundational decoding skills had been mastered and automised, while the untimed tasks assessed whether learners could answer the question or not without a time limit.

D. Data Analysis

The learners' reading performance data were analysed using descriptive and inferential statistical procedures. Inferential statistical analyses included testing for correlations and regression analyses. Preliminary analyses were done from the dataset in order to check assumptions of normality; hence, the Shapiro-Wilk test revealed normal distribution. However, despite schools showing normal distribution, non-parametric statistics were used for the inferential statistics because of the small sample size. The Statistical Package for Social Sciences (SPSS) software, Version 25, was used for the analysis of data.

E. Ethical Considerations

Before the Grade 1 learners' reading skills were assessed, ethical approval was sought from the University of South Africa (UNISA) with ethical clearance number AL_MK025_2017. Again, permission to test learners was sought from the Provincial Department of Education in Limpopo Province.

III. Results

A. Descriptive Statistics

Table 2 below, presents descriptive results for overall learner performance in raw scores in Term 1 and Term 3. The results are presented in terms of the mean (*M*), standard deviation (*SD*), and standard error of the mean (*SE*). It includes performance at the 25th, 50th, and 75th percentiles (i.e., showing the distribution of results at weaker, average and stronger levels) and the percentage of learners who scored zero on each task. A composite score comprising the *M*

derived from all five measures for baseline and endline assessment times was computed for the purpose of getting a picture of the overall performance for the cohort of Grade 1 learners tested.

TABLE 2
DESCRIPTIVE STATISTICS FOR OVERALL PERFORMANCE

	Term 1 (N=75)							Term 3 (N=72)						
	M	*SD*	*SE*	25th percentile	50th percentile	75th percentile	% zero score	*M*	*SD*	*SE*	25th percentile	50th percentile	75th percentile	% zero score
PA	2.3	1.7	0.1	1	2	3	13.3%	3.2	3.5	0.4	0	3	5	36%
LSK	6.3	5.8	0.6	2	5	8	2.7%	17.2	15.3	1.8	4	13	27	0%
WR	2.3	1	0.1	2	2	2	1.3%	8.3	10.4	1.2	1	4	13.7	14.7%
ORF	1.5	1.3	0.1	1	1	2	14.7%	11.1	18.4	2	0	1	13	37.3%
ORC	0.08	0.3	0	0	0	0	94.7%	0.98	1.9	0.2	0	0	1	70.7%
CS	12.4							40,7						

PA=phonological and phonemic awareness, LSK=letter-sound knowledge, WR=word reading, ORF=oral reading fluency, ORC=oral reading comprehension, CS=composite score

Learner performance across the five reading measures showed improvement from Term 1 to Term 3. However, performance on various subcomponents reflected a low knowledge base in both assessment times. The initial performance in the PA task was low, with learners in the 75th percentile managing only 3 items on average. The LSK score shows improvement far, much better than the other measures in Term 1. However, the ORC task showed a high proportion of floor effect in both assessment times.

B. Examining Relationships Between Different EGRA Components

Spearman's correlations were used to check the relations between the different reading components in Term 1 and Term 3, as shown in Table 3. Because performance was still so poor in Term 1, the focus was on the associations between the variables in Term 3. The PA showed relatively modest correlations with other subtasks, while LSK indicated robust relationships with WR and ORF but correlated moderately with ORC. WR showed strong associations with ORF and ORC, while ORF and ORC were also strongly correlated. Although Spearman's *rho* revealed moderate to robust significant correlations across different subtasks, none of these correlations were above 80%, except for WR and ORF (*rs*=.85). However, multicollinearity did not seem to pose a serious problem (Fields, 2013).

TABLE 3
CORRELATION BETWEEN DIFFERENT COMPONENTS OF READING

	Term 1 (March 2018)				**Term 3 (September 2018)**			
	LSK	WR	ORF	ORC	LSK	WR	ORF	ORC
PA	.40**	.51**	.01	.17*	.59**	.50**	.49**	.53**
LSK		.56**	.02	.08		.75**	.62**	.53**
WR			.12	.15			.85**	.69**
ORC				.23*				.77**

***p*< 0.01 **p*<0.05 **p*<0.01

Multiple regression analyses (MRA) were conducted using the enter method to see which variables functioned as best predictors to the dependent variable in Term 3 for performance on specific components of reading.

First, the effects of PA and LSK on word reading were examined. A significant model emerged $F(2,69) = 53.74$, $p < 0.01$. The model explains 60% of the variance in WR (Adjusted R2 = 0.598), with LSK as the only significant predictor. Table 4 gives information about regression coefficients for the predictor variables entered into the model. In other words, if learners' letter-sound knowledge improved by one *SD* (i.e., 15 lcpm), then they would, on average, be able to read 6.6 more words correctly per minute.

TABLE 4
RESULTS OF MRA WITH WR AS THE DEPENDENT VARIABLE

Model		B	Std. Error	*β*eta	*t*	*p*
1	(Constant)	-0.97	1.9		-.81	.41
	PA	0.56	0.30	0.18	1.86	0.06
	LSK	0.43	0.06	0.64	6.38	0.000**

**Significant at $p < 0.001$.

To see which foundational reading skills best predicted ORF, PA LSK and WR were entered into the model. A significant model emerged F (3,68) = 53.74, $p < 0.01$. The model explains 79% of the variance in ORF (Adjusted R2 = 0.790), with WR as the only significant predictor. Table 5 gives information about regression coefficients for the predictor variables entered into the model.

TABLE 5
RESULTS OF MRA WITH ORF AS THE DEPENDENT VARIABLE

Model		B	Std. Error	*β*eta	*t*	*p*
1	(Constant)	-1.39	1.56		-0.88	0.37
	PA	0.09	0.40	0.01	0.22	0.82
	LSK	-0.08	0.11	-0.06	-0.73	0.46
	WR	1.64	0.15	0.93	10.46	0.000**

**Significant at $p < 0.001$.

Finally, to see which early reading skills best predicted ORC, PA, LSK, WR, and ORF were examined. A significant model emerged F(4,67) = 92.28, $p < 0.01$. The model explains 84% of the variance in ORC (Adjusted R2 = 0.846). Table 6 gives information about regression coefficients for the predictor variables entered into the model. Oral reading fluency significantly predicted oral reading comprehension. When it comes to the relation of phonological and phonemic awareness and reading comprehension, the magnitude was weak ($\beta = 0.21$, $p < .05$). Thus, an increase of 1 *SD* in oral reading fluency (18 wcpm) could bring about an increase of 1.7 in the oral reading comprehension score, suggesting that the learners' ability to read for meaning at the end of Grade 1 is strongly related to their accurate and fluent reading aloud in Xitsonga.

TABLE 6
REGRESSION OF MRA WITH ORC AS THE DEPENDENT VARIABLE

Model		B	Std. Error	*β*eta	t	*p*
1	(Constant)	-0.17	0.14		-1.25	0.21
	PA	0.12	0.03	0.21	3.33	0.01
	LSK	-0.01	0.01	-0.07	-0.94	0.34
	WR	-0.01	0.02	-0.06	-0.53	0.59
	ORF	0.09	0.01	0.89	8.57	0.000**

**Significant at $p < 0.001$.

IV. DISCUSSION OF RESULTS

Spearman's correlations and the MRA were used to address the first and second research questions: How are the different reading components in Xitsonga interrelated? Which early reading skills in Term 1 predict later reading accomplishment at the end of Grade 1 in Xitsonga language?

The results revealed moderate to robust relations between all the subcomponents of reading. This corroborates several studies in various languages (Piper & Zuilkowski, 2016 in Swahili and English; Zenlit, 2017; Pretorius, 2018 in isiZulu and isiXhosa; Spaull et al., 2020 in Northern Sotho, Xitsonga and IsiZulu). The PA skills were strongly associated with the LSK and modestly associated with other subtasks. Although the results showed that the PA was only weakly related to oral reading comprehension, after entering all the predictor variables, a direct impact on reading comprehension was reported in other studies. For example, in Northern Sotho (Wilsenach, 2013) and Malayalam (Abdul & Remia, 2013), suggesting that teachers may not be paying attention to teaching the PA skills simply because it may not be informally or formally assessed like other reading skills. Knowledge of letter sounds strongly correlates with fluency and accuracy in the ability to read words but to a certain extent with reading for meaning, suggesting that different processes of reading come into play at different stages of development and contribute differently to reading outcomes as proficiency becomes evident.

The findings as per the hierarchical regression analysis showed that letter-sound knowledge significantly predicted word reading. These results corroborate several studies of children's early reading (e.g., Hulme & Snowling, 2015 in English; Snel et al., 2016 in Dutch; Pretorius, 2018 in isiZulu and isiXhosa; Schaefer & Kotzé, 2019 in isiZulu and isiSwati; Kim & Piper, 2019 in Swahili, Kamba and Lubukusu; Spaull et al., 2020 in Northern Sotho, Xitsonga and isiZulu). Ache et al. (2022) found that letter knowledge predicted both reading aloud and the accuracy of words in artificial orthography. Predictable and robust relationships between word reading and oral reading fluency were also evident. These results reveal the importance of word reading in reading fluently (with accuracy and speed), corroborating with several studies (e.g., Pretorius, 2018 in isiZulu and isiXhosa; Roembke et al., 2019 in English; Kim & Piper, 2019 in Swahili, Kamba and Lubukusu; Spaull et al., 2020 in Northern Sotho, Xitsonga and isiZulu). The National Reading Panel (2000) also emphasises that fluency depends upon well-developed word recognition skills. Pikulski and Chard (2005) reiterate the importance of decoding when they argue that children who lack the necessary foundation for developing decoding skills are in no position to read. Developing accurate word reading skills may be difficult for beginner readers; however, Ehri (2005) maintains that children can retrieve knowledge acquired from letter

sounds to help them read known and unknown words. This is especially true in transparent orthographies. The research in the Finnish (Aro, 2017), German (Landerl & Wimmer, 2008) and Spanish (Soriano-Ferrer & Morte-Soriano, 2017) languages show that in transparent orthographies, children can achieve accuracy early – leading to outstanding achievement by the end of Grade 1, but they need to be taught phonics well. Although some have suggested that strong effects between ORF and ORC are mainly obtained in English and that the relationship is not so strong in languages with transparent orthographies (Seidenberg, 2017), research in transparent languages shows strong associations between fluency and ORC (e.g., Piper & Zuilkowski, 2016 in Swahili and English; Pretorius, 2018 in isiZulu and isiXhosa; Spaull et al., 2020 in Northern Sotho, Xitsonga and isiZulu). The results of this study also revealed strong relations between oral reading fluency and reading comprehension in Xitsonga language. These results support the findings from other studies conducted in Northern Sotho, Xitsonga and isiZulu (Spaull et al., 2020) and in Kiswahili on both timed and untimed passage reading (Piper & Zuilkowski, 2016). Kim and Piper (2019) also showed that reading fluency is important for developing reading comprehension skills in African languages. In their structural equation model, oral reading fluency was consistently strongly related to reading comprehension across the three languages, e.g., Kiswahili, Kikamba and Lubukusu. Regression analysis showed that oral reading fluency was the only significant predictor of reading comprehension. These findings coincide with Zenlit 2017 assessment results which showed that oral reading fluency significantly predicted reading comprehension in isiXhosa and isiZulu, and also in English (Pretorius, 2018).

In terms of addressing the last research question (How does the relation between different reading components in Xitsonga impact the Grade 1 learners' ability to develop reading achievement?), the results showed an increase in scores from Term 1 to Term 3 across the different reading measures. However, literacy development for the Grade 1 learners was slow over the year and their performance on various early reading measures was low at the end of the year. Te results also revealed that more than a third of the learners could not read at the end of the year. This outcome could have been affected by the learners' inability to master their foundational reading skills, as also cautioned by Fuchs and Fuchs (1999) and Lyytinen et al. (2019) that failing to master early reading skills has serious implications which are likely to negatively impact learner performance throughout schooling.

V. Conclusion

Given what is proposed by Rumelhart (1977) with regard to his interactive model of reading, which emphasises the engagement of bottom-up and top-down reading development processes simultaneously, it is clear that reading achievement could be unlikely if learners have not properly mastered their home language foundational reading skills, which are the building blocks of reading. This suggests that even in transparent agglutinating languages such as Xitsonga, there is still a need for the learners to develop accuracy, fluency and speed in reading. This helps learners to focus on reading for meaning rather than spending much time decoding words. Thus, although Xitsonga uses a transparent orthographic system which is complemented by simple vowel systems, the structures and features of Xitsonga language may have implications for reading development, given the complex consonant codes containing trigraphs in words such as ***mby****ana* (dog), 4-consonant sequences, ***ntsh****ava* (mountain), and 5-consonant sequences, ***ndzhw****alo* (load). Hence, there is a need for reading to be taught and learned consciously in alphabetic languages, in particular, African languages, to help learners develop their early reading skills, which play important roles in the acquisition of reading in any alphabetic language.

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