Receptive vocabulary and early literacy skills in emergent bilingual Northern Sotho-English children

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This study explored receptive vocabulary size and early literacy skills (namely: letter naming, knowledge of phoneme-grapheme correspondences and early writing) in emergent bilingual Northern Sotho-English children. Two groups of Grade 1 learners were tested in both English and in Northern Sotho. Group 1 (N = 49) received their formal schooling in English, whilst group 2 (N = 50) received their formal schooling in Northern Sotho. Receptive vocabulary was tested using the Peabody Picture Vocabulary Test. Letter knowledge was assessed by asking learners to name letter cards, whilst knowledge of phoneme-grapheme correspondences was tested by asking children to match letter cards with spoken sounds. Early writing was assessed by asking children to write their names. Statistical analyses indicated that both English and Northern Sotho receptive vocabulary knowledge had a significant effect on early literacy skills, whilst no main effect was found for the language of instruction. Group 1 performed significantly better than Group 2 in English receptive vocabulary, in knowledge of phoneme-grapheme correspondences and in early writing, but no group differences were found for Northern Sotho receptive vocabulary or for letter knowledge. English receptive vocabulary significantly predicted the outcome of all of the early literacy skills, whilst Northern Sotho receptive vocabulary significantly predicted phoneme-grapheme correspondences and early writing.

Introduction

Young children need to learn thousands of new words during their formal schooling years in order to comprehend the (mostly written) content of their school work. According to Wolf (2008):

> [W]hen one realizes that children have to learn about 88 700 written words … and that at least 9000 of these words need to be learned by the end of grade 3, the huge importance of a child's development of vocabulary becomes crystal-clear. (p. 123)

English second language (ESL) learners who wish to use English as an academic language need to know about 5000 individual word forms (over 3000 word families) in order to comprehend 95% of an academic text (Laufer 1997). More recent research estimates that this number is even higher and that learners need to acquire 8000–9000 word families in order to successfully read a variety of texts in English (Hu & Nation 2000; Nation 2006).

Grade 1 learners worldwide arrive in school exhibiting marked differences in their vocabulary and emergent literacy skills. Learners from higher social economic status (SES) groups know about twice as many words as learners from lower SES groups, in both their first language (L1) and second language (L2) (if they have been exposed to one) (Farkas & Beron 2004; Graves 2006). Low SES children lag behind in vocabulary and in emergent literacy skills for the following reasons:

1. they often do not attend educationally focused kindergarten groups (and when they do, their caregivers typically have lower levels of education, and caregiver-child ratios are not ideal)
2. they have less access to a variety of printed materials in their homes and communities
3. parents of low SES children are less likely to engage in conversational and book-reading routines that enhance oral language development and emergent literacy skills (Hemphill & Tivnan 2008).

Unless vocabulary development is targeted specifically, learners from lower SES communities are unlikely to reach the word knowledge targets mentioned above.

In the South African educational context, the potential problems associated with insufficient vocabulary knowledge are believed to be intensified by the fact that many African learners from lower SES groups attend schools where the Language of Learning and Teaching (LoLT) is English. This often occurs from Grade 1 or otherwise from Grade 4 (i.e. after three years of instruction

in an African language). Although individual variation is to be expected, many South African children living in low SES communities may not have developed sufficient vocabulary skills in their L1 or L2 to support the development of literacy. However, research in support of this assumption is scarce, and little systematic information exists about the nature of baseline vocabulary skills in emergent bilingual first graders from low SES South African communities. Baseline assessment of vocabulary is useful and important in any educational context, as it motivates the need for vocabulary development (Graves 2006; Nation 2001; Read 2004). The present study explored the baseline receptive vocabulary knowledge of emergent bilingual Northern Sotho-English learners in Grade 1. The aim of this study was to establish how receptive vocabulary skills relate to the development of early literacy skills in these children, and to determine whether or not vocabulary levels could be used to identify children who are at risk of not acquiring literacy skills in the first grade.

Literature review
Vocabulary knowledge

There is no consensus on what it means to 'know a word' or what it means to 'measure vocabulary knowledge' (Hatami & Tavakoli 2012). Over the past three decades various frameworks of vocabulary knowledge have been developed based on models of the mental lexicon. The gist of all these frameworks is that vocabulary knowledge should be described as a multidimensional construct. Typically, scholars draw a distinction between two dimensions of vocabulary knowledge, namely *vocabulary breath* and *vocabulary depth*. Vocabulary breath is best understood as *vocabulary size* (i.e. the number of words for which some minimum knowledge of meaning exists in a learner's mental lexicon) (Nation 2001). Vocabulary depth, on the other hand, is defined as a learner's *level of knowledge of various aspects of a word*, including knowledge of the pronunciation, spelling, meaning and register, as well as knowledge of the morphological and syntactic properties of a specific word (Qian 1999; Wesche & Paribakht 1996).

These two dimensions of vocabulary knowledge correlate with each other (Qian 1999) and with reading comprehension (Anderson & Freebody 1983; Stahl & Fairbanks 1986). More recent perspectives suggest that vocabulary knowledge is not only associated with reading comprehension; it may also predict reading in a more fundamental way. According to the *lexical restructuring hypothesis*, children learn new words by drawing implicit comparisons between similar sounding words (Goswami 2001; Metsala & Walley 1998; Walley, Metsala & Garlock 2003). For example, the word *cut* is restructured from the already known and phonologically similar word *cat*. When children can distinguish such similar sounding sequences rapidly and accurately, it helps them to recognise sequences that represent new words. The hypothesis is that children with larger vocabularies are better attuned to new segments and, thus, acquire new words quickly. Goswami (2001) argues that lexical restructuring is

strongly tied to the emergence of phonological awareness, which in turn is a pre-requisite for learning to read. Put simply, when children know a word they can sound out the word more easily in print, which supports decoding and reading fluency.

Various assessment tools are used to measure the different dimensions of vocabulary knowledge, including tests that require the learner to identify a synonym or definition for a particular word, to translate a word into the L1, or to use checklists (Wesche & Paribakht 1996). Such vocabulary measures require 'just a single response to each target word and, by implication, give only a superficial indication of whether the word is known or not' (Read 2004:211). Measuring vocabulary depth is, thus, tricky and time-consuming. Vocabulary breath, on the other hand, is measured more easily and is often associated with performance on receptive vocabulary tests, such as the Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn 2007). In such tests, individuals only need to show some minimal understanding of a word in order for it to be considered known.

Theoretical framework

Two main schools of thought exist with regards to the role of oral language skills in literacy achievement (where 'oral language' typically refers to vocabulary). On the one hand, researchers argue that oral language skill is an essential prerequisite for the emergence of phonological awareness (PA) skills, but that PA, once it starts to develop, is the single most important linguistic skill that determines the success of literacy development in the lower grades. This position is referred to as the *Phonological Sensitivity Approach* (PSA) (Dickinson *et al.* 2003). Since the 1980s, a massive body of work has established that different aspects of PA are indeed critical precursors and predictors of reading achievement (Bradley & Bryant 1983; Cronin & Carver 1998; MacLean, Bryant & Bradley 1987; Shankweiler *et al.* 1999; Shankweiler & Fowler 2004; Wagner & Torgeson 1987; Wagner, Torgeson & Rachotte 1994; Whitehurst & Lonigan 2001). The perspective of Shankweiler *et al.* (1999:70) that 'deficient skill in mapping between the alphabetic representations of words and their spoken counterparts is the chief barrier to comprehension of text' became widely influential and shaped research and analytical approaches so much that little attention was paid to the independent contribution of other language skills to reading. In line with the PSA, Whitehurst and Lonigan (2001) designed a model of the relationship between language skills and early reading skills, in which *outside-in* skills (i.e. meaning construction skills) were observed only indirectly via their impact on *inside-out* skills (decoding skills). The influence of outside-in skills was restricted to the preschool years and was believed to be unimportant once formal reading instruction began. Thus, in the PSA the strong and direct predictors of reading success are phonological and alphabetical. On the other hand, advocates of the *Comprehensive Language Approach* (CLA) claim that early literacy depends on a number of interrelated variables, including the following:

- oral language (i.e. vocabulary knowledge and discourse knowledge)
- PA
- knowledge of print (e.g. letters and orientation of letters on a page)
- knowledge of phoneme-grapheme correspondences
- an understanding of the various uses of print (Dickinson & McCabe 2001; Dickinson *et al.* 2003).

Advocates of the CLA propose that the relationship between language, reading and writing is complex, and that whilst reading and writing may be perceived as separate functional systems, they are highly interdependent and rely on common as well as unique underlying aspects of the linguistic system. Berninger *et al.* (2001:64) introduced the term *flexible orchestration* to describe this interdependency, claiming that reading and writing development cannot be understood without considering 'the different ways those common language processes may be orchestrated, depending on which functional system is activated'.

The importance of developing vocabulary skills alongside PA skills in young learners has also been stressed by researchers working with children who are at high risk of reading failure (such as low SES children). Hemphill and Tivnan (2008) assessed several language and early literacy skills (including receptive vocabulary, letter knowledge, sight word reading, phonemic awareness and word attack) in a group of low SES children and found that beginning-of-grade-one vocabulary knowledge best predicted reading comprehension at the end of the second and third grade. In line with similar longitudinal studies (see Sénéchal & Le Fevre 2002; and Spira, Bracken & Fischel 2005), Hemphill and Tivnan (2008) found that early literacy skills such as letter knowledge and work attack (i.e. essentially the ability to decode print) were the strongest predictors of reading comprehension at the end of the first grade, but that receptive vocabulary better predicted reading comprehension at the end of Grade 2 and continued to reliably predict reading success at the end of Grade 3. Scarborough (2001) analysed the impact of several aspects of oral language on reading development in both normally developing and at risk children and concluded that (1) expressive and receptive vocabulary are highly correlated with each other during preschool and reliably predict later reading and (2) reading ability in children is not reliably predicted by a single linguistic domain during the preschool years.

Whilst it seems clear that a wide range of language and emergent literacy skills form the basis for later reading, the relative importance of *outside-in* skills and *inside-out* skills, as early predictors of literacy development, remains hotly debated in the associated literature. Hemphill and Tivnan (2008) and Scarborough (2001) emphasise that this debate has serious implications for the design of early literacy teaching programmes and early reading intervention programmes. Programmes that do not target the full range of *outside-in* and *inside-out* skills are unlikely to be successful. Given the typical constraints of doing research in this field (such as

time and resources and limitations related to working with young children), most researchers do not manage to measure the full range of *outside-in, inside-out* and reading skills in a large sample of children at a single point in time. As a result, although the literature suggests that both receptive and expressive vocabulary are significantly related to early literacy skills and word decoding in beginning readers, the exact nature of the relationship between vocabulary knowledge and emergent literacy is still not clear.

The focus of the present study is on the relationship between *receptive vocabulary* and *early literacy skills* (including *letter knowledge, knowledge of phoneme-grapheme correspondences* and *early writing*) in emergent bilingual Northern Sotho-English speaking children. The present study is limited in that other language skills, such as expressive vocabulary knowledge, PA, word attack and reading were not assessed, seeing that:

1. the majority of the learners studied have not acquired vocabulary skills in their L2 (English) to such an extent that L2 vocabulary could be measured expressively
2. most aspects of PA were so poorly developed in this sample that it was difficult to assess PA skills
3. the majority of the learners have not started to decode text.

Phonological, vocabulary and reading skills in Northern Sotho children

Existing evidence suggests that reading levels in African languages, including Northern Sotho, are below international standards (Howie *et al.* 2008; Combrinck, Van Staden & Roux 2014). Researchers are becoming more interested in explaining poor literacy development in African languages in relation to linguistic skills, but so far this interest has primarily focused on the relationship between various PA skills and literacy development (see Soares De Sousa, Broom & Fry 2010; Veii & Everatt 2005; Wilsenach 2013). Wilsenach (2013) established that Northern Sotho PA (measured in terms of syllable awareness) significantly predicts word reading in both Northern Sotho and English in emergent bilingual Northern Sotho-English children. No information exists about the effect of vocabulary skills on the development of early literacy skills in these children. Pretorius and Mokhwesana (2009) assessed the development of a range of language (including vocabulary) and literacy skills in Northern Sotho learners over a period of four years, in order to measure the effectiveness of a reading intervention programme in a high poverty school. Northern Sotho expressive vocabulary was tested using an adapted version of the Renfrew test. The authors noted (p. 66) that 'an area that clearly needs more attention is that of vocabulary development', as the learners showed only very slight increases in vocabulary size over the course of four years. Pretorius & Mokhwesana's focus was not on the relationship between vocabulary and literacy skills and, therefore, they did not attempt to draw correlations between these skills. The present study will address this gap in the literature, with the aim of increasing our understanding of the role that vocabulary size plays in

the development of early literacy skills in emergent bilingual Northern Sotho-English learners.

Research questions and hypotheses

The following research questions will be addressed in this study:

1. What is the nature of receptive vocabulary and early literacy skills in emergent bilingual Northern Sotho-English children?
2. Is there a difference between the vocabulary skills and early literacy skills of Northern Sotho children who are instructed in their L1 versus Northern Sotho children who are instructed in their L2 (English)?
3. What is the relationship between receptive vocabulary skills and early literacy skills in emergent bilingual Northern Sotho-English children?

This study adopts the CLA as its main theoretical framework, and it is, thus, hypothesised that receptive vocabulary skills will significantly correlate with early literacy skills and that vocabulary is likely to predict early literacy skills (*letter knowledge*, *knowledge of phoneme-grapheme correspondences* and *early writing*). Furthermore, it is predicted that the two groups of children studied here will show a pattern of development that is influenced by the LoLT; the learners receiving instruction in English are expected to have a larger English vocabulary than the learners who receive instruction in Northern Sotho, and vice versa.

Methodology

The research setting

The current study was undertaken in two primary schools located in a low SES suburb on the outskirts of Pretoria (one of the capital cities of South Africa). Northern Sotho is widely spoken as the home language in this suburb, but several other African languages are spoken in the research area as well. Northern Sotho is used as LoLT in some schools within the research area (from Grade R – Grade 3). After Grade 3, the LoLT changes to English. Northern Sotho was used as LoLT in one of the schools involved here; the other school followed a straight for English language policy. The 'Northern Sotho school' was a quintile one school, whereas the English school was a quintile two school.[1] Both schools had functioning libraries containing around 5000 books and the educators in both schools had equal access to the basic resources required to teach literacy to first graders.

Participants

99 Grade 1 learners participated in the study. The learners all indicated that they spoke Northern Sotho at home and were divided into two groups: group 1 (*N* = 49; mean age 6.9 years) received their Grade 1 instruction in English, whereas group 2 (*N* = 50; mean age 6.7 years) received their Grade 1 instruction in Northern Sotho. There was no significant difference between the groups in terms of age and the gender of the learners was controlled as much as possible (Group 1 = 24 female and Group 2 = 26 female). The learners were tested individually during a single session lasting approximately 30 minutes. The research was conducted during the third term of the school year, after informed assent from each learner and informed consent (from the learners' parents and the relevant educational authorities) had been obtained.

Data collection and analysis

Vocabulary knowledge

Receptive vocabulary knowledge was tested using the PPVT (Dunn & Dunn 2007). English receptive vocabulary was assessed using Form B, whilst Northern Sotho (NS) receptive vocabulary was assessed by translating Form A into Northern Sotho. The first 108 items (Set 1 to Set 9) were translated, using the Oxford Bilingual School Dictionary (English-Northern Sotho) (De Schryver 2007) and the online dictionary of the site African languages (http://africanlanguages.com/northern_sotho/). The translations were checked for inaccuracies with the assistance of three Northern Sotho mother tongue speakers (two Grade 1 educators and one school librarian). The translated items were piloted with five learners and, based on their responses, further adjustments were made.[2] The Peabody test was administered as prescribed in the test manual: the researcher presented a page with four pictures to the learner and said the target word out loud (describing one of the pictures). The learner was asked to point to the matching picture. All learners were first assessed in English and then in Northern Sotho. English receptive vocabulary was measured by calculating raw scores and transforming these to standard scores, using the age norms provided in Dunn and Dunn (2007). A mean standard score for *English receptive vocabulary* was calculated for each group, as well as a mean equivalent age. *NS receptive vocabulary* was measured by calculating a raw score for each individual learner. The individual raw scores were used to calculate mean raw scores for *NS receptive vocabulary* in each of the groups.

Letter knowledge

Letter knowledge was assessed by asking learners to name letter cards. The researcher placed the letter cards, one by one, in front of the learner and requested the learner to name the letter. All the letters presented in the study had been introduced in class; the researcher confirmed that this was the case with the relevant educators. Learners had to name ten letters, randomly selected from the following set: *a; b; e; f; g; i; l; m; n; o; p; r; s; t; u*. Individual learners were awarded

marks out of ten, which were transformed to percentages and used to calculate a mean percentage for *letter knowledge* in each group.

Phoneme-grapheme correspondences

Knowledge of phoneme-grapheme correspondences was tested by asking children to match letter cards to spoken phonemes. The researcher spoke a phoneme and requested the learner to select the matching grapheme. All phonemes included in the study had been introduced in class during the first half of the year. Learners had to match ten randomly spoken phonemes to letter cards, from the following set: /a/; /b/; /e/; /f/; /g/; /l/; /m/; /n/; /o/; /p/; /r/; /s/; /t/. Individual learners were awarded marks out of ten, which were transformed to percentages and used to calculate a mean percentage for *phoneme-grapheme correspondences* in each group.

Early writing

Early writing was measured by asking learners to write down their names and surnames. Learners were awarded one of the following scores: 100% (both name and surname correct); 50% (name or surname correct); 0% (neither correct). Mean scores depicting *early writing* was calculated for each group.

Statistical analyses

Independent samples t-tests were conducted to determine differences between the groups in vocabulary skills in both languages. Following this, a multivariate analysis of covariance (MANCOVA) was conducted (GLM option multivariate), with the variable *group* entered as fixed factor and *NS receptive vocabulary* and *English receptive vocabulary* entered as covariates. *Letter knowledge*, *phoneme-grapheme correspondences* and *early writing* were entered into the model as dependent variables. This model was used to determine the effect of *Group* on the dependent variables when the covariates were held constant, to determine the effect of vocabulary skills on early literacy skills and to establish any group differences in early literacy skills. Pearson correlations and three separate multiple regression analyses (method *enter*, with *NS receptive vocabulary* and *English receptive vocabulary* as independent variables and *letter knowledge*, *phoneme-grapheme correspondences* and *early writing* as dependent variables) were conducted on the collapsed data set in order to determine the relationships between all the measures.

Findings
Main effects and group differences

Multivariate testing (Pillay's trace) showed a significant main effect for the covariates *English receptive vocabulary* (F[3,93] = 10.63; *p* = 0.000) and *NS receptive vocabulary* (F[3,93] = 3.29; *p* = 0.024). Pillay's trace for *Group* was not significant (F[3,93] = 2.51; *p* = 0.063), suggesting that *Group* did not have a significant effect on early literacy skills when the effect of vocabulary knowledge was controlled. Following the significant multivariate test, tests of between subject effects and Tukey's HSD post-hoc tests (applying Bonferroni corrections) were conducted. The between subjects tests indicated that *English receptive vocabulary* had a significant effect on *letter knowledge* (F[1,95] = 14.37, *p* = 0.000), on *phoneme-grapheme correspondences* (F[1,95] = 29.26, *p* = 0.000), and on *early writing* (F[1,95] = 10.28, *p* = 0.002). *NS receptive vocabulary* had a significant effect on *phoneme-grapheme correspondences* (F[1,95] = 9.51, *p* = 0.003) and on *early writing* (F[1,95] = 7.83, *p* = 0.006), but no effect on *letter knowledge* (F[1,95] = 3.01, *p* = 0.086). The mean scores and test statistics obtained for the measures *English receptive vocabulary*, *NS receptive vocabulary*, *letter knowledge*, *phoneme-grapheme correspondences* and *early writing* are represented in Table 1.

Independent samples t-tests (two-tailed) indicated that the mean difference for *English receptive vocabulary* was significant (t = 2.4; *p* = 0.018), but that there was no significant difference between the groups with regards to *NS receptive vocabulary* (*t* = 0.21; *p* = 0.83). The Tukey HSD post-hoc tests indicated that group 1 performed significantly better than group 2 in terms of *phoneme-grapheme correspondences* (F = 5.81; *p* = 0.018) and *early writing* (F = 7.03; *p* = 0.009), but no group difference was established for *letter knowledge* (F = 3.23; *p* = 0.075).

Correlations and multiple regression analyses

Pearson correlations (two-tailed) indicated that all the measures were positively and significantly correlated. The *r*-values of the correlations are given in Table 2. Significant correlations are flagged with an asterisk.

Multiple regression models with *letter knowledge*, *phoneme-grapheme correspondences* and *early writing* as dependent variables showed that *English receptive vocabulary* significantly predicted the outcome of all of the early literacy

TABLE 1: Mean standardised score for *English receptive vocabulary*, Mean raw score for *NS receptive vocabulary*, and Mean percentages for *Letter knowledge*, *Phoneme-Grapheme correspondences* and *Early Writing*.

Variable	Group 1 (*N* = 49)		Group 2 (*N* = 50)		Statistic		Value
	M	(SD)	M	(SD)	T	F	P
English vocabulary standard score	55.51	(10.53)	50.64	(9.59)	2.4	-	0.018*
NS vocabulary raw score	48.37	(10.83)	47.92	(10.10)	0.21	-	0.832
Letter knowledge	80.2	(22.96)	67.60	(25.27)	-	3.23	0.075
Phoneme-grapheme correspondences	66.94	(23.47)	51.60	(25.18)	-	5.81	0.018*
Early writing	72.45	(32.37)	49	(39.75)	-	7.03	0.009*

M, mean; SD, standard deviation
*, Significant at the 0.05 level.

TABLE 2: *R*-values of Pearson correlations between *English receptive vocabulary*, *Northern-Sotho receptive vocabulary*, *Letter knowledge*, *Phoneme-grapheme correspondences* and *Early writing*.

Variable	NS vocabulary	Letter knowledge	Phoneme-grapheme correspondence	Early writing
English vocabulary	0.425*	0.486*	0.618*	0.475*
NS vocabulary	-	0.331*	0.459*	0.398*
Letter knowledge	-	-	0.801*	0.573*
Phoneme-grapheme correspondence	-	-	-	0.854*

*, Correlation is significant at the 0.01 level.

TABLE 3: Overview of regression analyses with *Letter knowledge*, *Phoneme-Grapheme correspondences* and *Early writing* as dependent variables and *English receptive vocabulary* (PPVT) and *NS receptive vocabulary* (NS PPVT) as predictors.

Steps	Letter knowledge			Phoneme-grapheme correspondence			Early writing		
	B	SE	*Beta*	B	SE	*Beta*	B	SE	*Beta*
Step 1 (constant)	11.67	11.55	-	−21.66	10.62	-	−32.22	17.77	-
PPVT	1.17	.21	0.48***	1.52	0.19	0.62***	1.75	0.329	0.48***
Step 2 (constant)	2.47	12.89	-	−36.48	11.54	-	−54.4	19.46	-
PPVT	1.02	0.24	0.42***	1.27	0.21	0.52***	1.37	0.35	0.37***
NS PPVT	0.36	0.23	0.15	0.58	0.21	0.24**	0.87	0.35	0.24*

B, beta, SE, standard error
Note: Letter knowledge: R^2 = 0.24 for Step 1; change in R^2 for Step 2 = 0.02
Phoneme-grapheme correspondences: R^2 = 0.38 for Step 1; change in R^2 for Step 2 = 0.05,
Early writing: R^2 = 0.23 for Step 1; change in R^2 for Step 2 = 0.05
*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$ (95% confidence interval)

skills and that *NS receptive vocabulary* significantly predicted *phoneme-grapheme correspondences* and *early writing*. (English receptive vocabulary was entered at Step 1 of the model and NS receptive vocabulary entered at Step 2). The constant values, betas, standard errors, standardised betas and R^2 values for each of these regression analyses are provided in Table 3.

English receptive vocabulary significantly predicted *letter knowledge* ($p = 0.000$), and accounted for 24% of the variance in Step 1 of this model. After *NS receptive vocabulary* was added as a predictor in Step 2, the model accounted for 25% of the variance, but *NS receptive vocabulary* was not a significant independent predictor of letter knowledge ($p = 0.12$). Likewise, *English receptive vocabulary* significantly predicted the outcome of the *phoneme-grapheme correspondence* test ($p = 0.000$) and accounted for 38% of the variance at Step 1 in the model. *NS receptive vocabulary* accounted for another 5% of the variance at Step 2 of this model, and was found to also be a significant predictor of *phoneme-grapheme correspondences* ($p = 0.006$). Finally, *English receptive vocabulary* reliably predicted performance in the *early writing* task ($p = 0.000$) and accounted for 23% of the variance at Step 1 of the model. *NS receptive vocabulary* accounted for another 4% of the variance in Step 2 and was also an independent predictor of *early writing* ($p = 0.014$).

Discussion

The primary aim of this study was to establish the nature of the relationship between bilingual receptive vocabulary skills and early literacy skills in Grade 1 learners who grew up speaking Northern Sotho as their home language. The learners had been exposed to English (in varying degrees) for at least six months prior to the study, and as such could be described as emergent bilingual Northern Sotho-English learners. This study focused on two populations of learners: Group 1 attended a school where the LoLT is English from Grade 1 onwards, whereas Group 2 attended a school where the LoLT is Northern Sotho in the foundation phase

(i.e. Grade 1–3) and where English is introduced as First Additional Language (FAL) in the first grade. Three research questions were posed at the outset of the study.

The first research question asked: 'What is the nature of receptive vocabulary and early literacy skills in emergent bilingual Northern Sotho-English children?'

The English receptive vocabulary levels were very low in both groups. It is not best practise to transform raw scores obtained on the PPVT to standard scores (SSs) in ESL learners (Dunn & Dunn 2007), but because the focus of this study was (partly) on investigating the effect of receptive vocabulary on early literacy skills in different groups of learners, and not on measuring individual performance, it was deemed acceptable to transform the raw scores into SSs in order to reliably detect group differences. Group 1 (English LoLT group) obtained an average SS of 55.51 (3 standard deviations below the norm; age equivalent 37 months [3;1]). Group 2 (Northern Sotho LoLT group) obtained an average SS of 50.64 (around 3.5 standard deviations below the norm; age equivalent 32 months [2;6]). Standard scores below 70 (i.e. more than two standard deviations below the norm) are considered to be extremely low (Dunn & Dunn 2007) and SSs below 55 (3 to 4 standard deviations below the norm) very rarely occur in L1 speakers of English. The aim of this discussion is not to *compare* the emergent bilingual children tested here with the levels reached by L1 speakers of English, but to consider whether or not (given their current scores on the PPVT), the learners' English vocabulary knowledge is sufficiently developed to support literacy and general scholastic development, particularly in light of the fact that all of these learners will eventually have to use English as LoLT.

In trying to answer this question it is useful to reflect on previous research with emergent bilingual children that employed the PPVT. Hemphill and Tivnan (2008) used the PPVT to assess English receptive vocabulary in low SES

emergent bilingual Spanish-English children over a set period of time. The children obtained a mean SS of 87 on the PPVT at the beginning of the first grade; a score that was nearly one standard deviation below the norm (placing the learners at the 19th percentile) and which was considered to be an indication of weak vocabulary skills. Hemphill and Tivnan (2008:444) found that these children were unlikely to reach expected standards in English reading and concluded that 'even in the context of districtwide literacy reform initiatives, which raised all children's potential for success, children's vocabulary skills at the beginning of the first grade made a critical contribution to later achievement in reading comprehension'. In another study with at risk bilingual Spanish-English children, Carlisle *et al.* (1999) tested children using the PPVT and recorded a SS of 63, more than two standard deviations below the norm. Carlisle *et al.* (1999) found that these emergent bilingual children had relatively poorly developed L1 skills, and that a significant portion of the variance in reading comprehension was explained by performance on the PPVT in both English and Spanish. In the above studies, emergent bilingual Hispanic children whose English vocabulary levels were higher than the levels achieved by the emergent bilingual children in the present study were at risk of performing poorly in reading comprehension. Thus, emergent bilingual children in other parts of the world are considered to be at risk of not acquiring adequate reading comprehension skills (in English) when their English PPVT scores are more than one standard deviation below the norm at the beginning of the first grade. Given this knowledge, the SSs obtained by the learners in this study are worryingly low, and it seems reasonable to conclude that they are at risk of reading failure, especially at the comprehension level. Both groups obtained higher raw scores on the translated Northern Sotho version of the PPVT than on the English version. It is not possible to directly compare the L1 and L2 vocabulary levels of the children in this study seeing that the Northern Sotho translation used here is not standardised, but it did seem as if the learners' L1 vocabulary knowledge was somewhat more developed. Children with underdeveloped vocabularies need to learn words at a rate of three to four root words per day, if they are to catch up with their peers within five or six years (Biemiller 2003). Given this, it seems fair to conclude that vocabulary development in both the L1 and L2 should be targeted in the South African curriculum from as early as possible (i.e. in Grade R [Reception] or in Grade 1).

The development of *letter knowledge, phoneme-grapheme correspondences* and *early writing* seemed to be on track in the English group. The learners in the Northern Sotho LoLT group, on the other hand, fared significantly poorer in these skills and it was clear that many of the children in this group have not yet mastered literacy skills that are typically acquired before or at the beginning of the first grade (in other socio-educational contexts). The literature on the nature and development of emergent reading skills (as discussed in the literature review) and the association between such skills and later reading is quite extended. Based on this research, it seems fair to conclude that the ability to map graphemes onto phonemes needs to be developed further in the tested sample in order to facilitate decoding. The literature on the nature and development of emergent writing skills is not as well developed, but previous research suggests that pre-schoolers can write some letters of the alphabet (Puranik & Lonigan 2011), can write their names (Bloodgood 1999; Both-De Vries & Bus 2008), can scribble or draw to communicate (Levin & Bus 2003) and can successfully write some single words (Puranik, Lonigan & Kim 2011). These early writing skills develop substantially between the ages of three and five (Puranik & Lonigan 2011), again suggesting that the learners in the Northern Sotho LoLT group are lagging behind in early writing.

The literature offers several suggestions about why emergent bilingual children might experience difficulties with language and literacy acquisition. Scholars have claimed that bilingual children are in fact in an advantageous position when it comes to learning to read – seeing that cognitive and metalinguistic capabilities have been found to be enhanced in bilingual children, compared to monolingual children (Diaz & Klingler 1991; Bialystok 1987a, 1987b). Bilingual children fare better in tasks requiring grammatical judgement, and they have a more advanced understanding of *word concept* than monolinguals (Bialystok 1987a, 1987b). However, it is argued that *only balanced bilingual children* (i.e. children with comparable levels of L1 and L2 proficiency) will exhibit increased cognitive and metalinguistic development, and that only such children will benefit from being bilingual (Cummins 1991, 1993, 2000). This hypothesis, known as the *Linguistic Threshold Hypothesis*, has been criticised widely, as the level of linguistic proficiency that has to be attained in order to yield the benefits of bilingualism is not clear. One attempt to define the threshold level has focused on *age-appropriate abilities* in both languages (Diaz & Klingler 1991). By this definition, children with below average language development in either language would not derive the potential metalinguistic benefits of bilingual development. Assuming that this definition is correct (and keeping in mind the performance on the PPVT) one could conclude that the emergent bilingual children tested here are unlikely to benefit from the theoretical advantages of bilingualism. It is more likely that their low levels of bilingualism might lead to low levels of academic achievement.

Bilingual children might also experience difficulties with acquiring language and literacy skills when their L1 development is limited. Cummins (1991, 1993, 2000) claims that L1 proficiency is a critical resource that children bring to their learning of an L2, a hypothesis he developed in his *Linguistic Interdependence Theory.* Cummins' hypothesis is that L2 learners automatically turn to their existing knowledge of grammatical structures, grammatical categories and linguistic functions, and that they try to analyse the relationships between grammatical structures/categories and meanings in their L2, based on this knowledge. When native language skills are underdeveloped, this might affect L2 learning, even when children receive their schooling in the L2. With regards to literacy, the *Linguistic Interdependence*

Theory proposes that those aspects of linguistic knowledge that is required for learning to read will transfer automatically from the L1 to the L2 and that they do not have to be relearnt in the L2. However, when such linguistic knowledge has not been developed in the L1, the learner is supposedly at a deficit (Cummins 2000). Some scholars believe that metalinguistic benefits are more obvious in bilinguals who speak languages that have similar sound structures (e.g. Spanish-English bilinguals) than in bilinguals whose languages have different sound structures (e.g. Chinese-English bilinguals) (Bialystok, Majumder & Martin 2003). Enhanced metalinguistic ability is perhaps not the result of bilingualism in itself, but of speaking a combination of languages that share similar features. Emergent bilingual children in South Africa typically speak African languages as first languages, which have linguistic structures that are different to that of English. The extent to which a theory like the *Linguistic Interdependence Theory* holds true in this context has not been fully determined, but some studies have questioned whether or not it is correct to apply this theory to all aspects of linguistic skill in contexts where bilingual children are exposed to an African-European combination of languages. In one such study, Soares De Sousa *et al.* (2010:530) investigated PA and spelling skills in emergent bilingual Zulu-English children and found that 'the transferability of some, but not all phonological processing skills may be equivalent across languages'. They noted that easier levels of phonological processing skills, such as syllable awareness and onset awareness (i.e. the ability to separate the onset '*c*', from the rime '*–at*' in the word '*cat*'), may be transferred between languages, even when the phonological structures of the languages are diverse. However, complex levels of PA, such as rime and phoneme awareness as well as spelling skills in languages that have diverse orthographies may rely on language specific and orthographic knowledge. Such specific knowledge may need to be formally taught for each language and might not transfer automatically from the L1 to the L2.

The second research question asked:

> Is there a difference between the vocabulary skills and early literacy skills of Northern Sotho children who are instructed in their L1 versus Northern Sotho children who are instructed in their L2 (English)?

The learners who received their Grade 1 instruction in English performed significantly better in the PPVT, the phoneme-grapheme correspondence test and the early writing assessment, but there was no group difference in letter knowledge or knowledge of Northern Sotho vocabulary. It was anticipated that Group 1 would outperform Group 2 in English receptive vocabulary, given the fact that Group 1 received their schooling in English. It is safe to assume that Group 1's enhanced performance was the result of their increased exposure to English. The results also suggest that the Northern Sotho learners who received instruction in English were not rapidly losing their Northern Sotho vocabulary skills.

It was hypothesised that the learners who received instruction in Northern Sotho would show a somewhat bigger Northern Sotho receptive vocabulary (compared to English LoLT group), seeing that exposure to storybook reading, focused discourse activities and dialogic shared reading (to which the learners should have been exposed in Northern Sotho in the first half of the year) are all associated with vocabulary growth (Beals 2001; Sénéchal *et al.* 1998; Whitehurst & Lonigan 2001). This hypothesis turned out to be incorrect. Classroom observation did not form part of this study, which makes it impossible to speculate about the extent to which educators engaged in the activities mentioned above, but it is worrying that the learners in Group 2 were not showing evidence of developing their vocabulary skills in either their L1 or their L2. The enhanced performance of the English LoLT group in the phoneme-grapheme correspondence test, and in the early writing assessment, was not predicted and was somewhat surprising, given the theoretical advantages of mother tongue education (or bilingual education in which the L1 features). Benson (2005), summarised these theoretical advantages as follows:

1. learners find it easier to grasp sound-symbol or meaning-symbol correspondences when initial literacy instruction takes place in a familiar language
2. the introduction of new concepts in content subjects does not have to wait until after learners are competent in the L2
3. the L2 can be taught systematically from early on in bilingual programmes, in ways that allow learners to acquire the L2 through communication
4. transfer of linguistic and cognitive skills is facilitated in bilingual programs
5. assessment of learning is potentially more accurate in bilingual classrooms
6. the use of the L1 strengthens the affective domain of learners (including self-confidence, self-esteem and motivation)
7. learners become highly functional in two languages.

In the present study, these advantages were not immediately apparent.

The learners in the Northern Sotho LoLT group named letters correctly 67.6% of the time, identified the correct grapheme 51.6% of the time when presented with a phoneme and less than half of these learners could write their name and surname correctly. The multivariate testing showed a significant main effect for the covariates *English receptive vocabulary* and *NS receptive vocabulary,* suggesting that in this particular sample, the size of a learner's receptive vocabulary (in the L1 and the AL) was more likely to have an effect on the child's early literacy development than the LoLT (there was no significant main effect for *Group* overall). This is an important finding, as it highlights the need to (in the South African context) respond cautiously and responsibly to the commonplace phrase *mother tongue education is best*. Whilst the argument here is not against the theoretical advantage of mother tongue instruction, the

findings of this study suggest that mother tongue education does not *automatically* guarantee successful attainment of (early) literacy skills. Mother tongue education that fails to develop a wide range of L1 linguistic skills (including vocabulary skills), and that happens in a context where the learner is unlikely to receive parental support, and exposure to print in the mother tongue outside of school, is arguably not better for a child. Various social variables (such as early exposure to storybooks and other forms of print, caregiver support and interaction, SES status, quality of education and educational programmes) and cognitive variables influence a learner's school-readiness and Grade 1 performance and, thus, the LoLT might not be the most significant predictor of scholastic success in the South African context. This conclusion is in line with Benson (2005), who stressed that the advantages of mother tongue education mentioned above are based on two assumptions:

> one, that basic human needs are being met so that schooling can take place; and two, that mother tongue-based bilingual schooling can be properly implemented. Simply changing the language of instruction without resolving other pressing social and political issues is not likely to result in significant improvement in educational services. (p. 4)

The final research question asked: 'What is the relationship between receptive vocabulary skills and early literacy skills in emergent bilingual Northern Sotho-English children?'

Pearson product moment correlations indicated that there was a positive and moderately strong association between *English receptive vocabulary* and *NS vocabulary* (*R* = 0.425). Furthermore, *English receptive vocabulary* was strongly associated with *phoneme-grapheme correspondences* (*R* = 0.618), whilst *letter knowledge* (*R* = 0.486) and *early writing* (*R* = 0.475) were found to be moderately associated with *English receptive vocabulary*. *NS receptive vocabulary* was moderately associated with *phoneme-grapheme correspondences* (*R* = 0.459). The associations between *NS receptive vocabulary* and *letter knowledge* and *NS receptive vocabulary* and *early writing* were also significant, but had *R*-values between 0.3 and 0.4 and could be described as moderately weak (following the categorisation in Dancey & Reidy [2004]). The interrelationships between the early literacy measures were also tested. Pearson product moment correlations indicated that *letter knowledge* was positively and strongly associated with *early writing* (*R* = 0.573) and positively and very strongly associated with *phoneme-grapheme correspondences* (*R* = 0.801). The strongest association was found between *phoneme-grapheme correspondences* and *early writing* (*R* = 0.854).

It is clear from the correlation and regression statistics that both L1 and L2 receptive vocabulary skills were positively associated with and significantly predicted the outcome of the early literacy measures. *English receptive vocabulary* reliably predicted all of the early literacy measures, whereas *NS receptive vocabulary* reliably predicted the outcome of the *phoneme-grapheme correspondences* test and of *early writing*. Combined, the correlation and regression statistics support

Berninger *et al.*'s (2001) proposition that (early) reading and (early) writing skills are highly interdependent and that they rely on common as well as unique aspects of language development. The findings of the present study supports the notion put forward by the CLA (Comprehensive Language Approach) that the development of early literacy skills are not only dependent on the development of PA skills, but that it depends on the development of a wide range of language abilities. The 'outside-in' skills (i.e. meaning construction skills) that were measured in the present study significantly contributed to the learners' development of early literacy skills, even during the second half of the first grade, after the onset of formal literacy instruction. The findings presented here do not support the PSA (Phonological Sensitivity Approach) and Whitehurst and Lonigan's model, which argue that decoding (i.e. PA skills) is the single most important skill in early literacy development, seems questionable. The results of the present study suggest that receptive vocabulary knowledge (an 'outside-in' skill), is a direct factor that determines the development of early literacy skills in emergent bilingual children. Therefore, bilingual vocabulary development should be targeted specifically in the South African educational context, as emergent bilingual children from low SES communities clearly arrive in Grade 1 with underdeveloped vocabulary skills, particularly in English.

Recommendations for the classroom

The results of this study emphasise the importance of developing both the L1 and L2 vocabulary skills of emergent bilingual first graders in the South African context. Practical ways in which educators can do this include:

1. storybook reading, which provides opportunities for extended discussions and the introduction of new words
2. ensuring that the classroom is a word rich environment, by labelling objects in the classroom and by pinning words (and pictures) on the board
3. providing learners with a range of texts and text types (this could include books, but also flyers, advertisements, newspapers and magazines)
4. encouraging a 'word of the day' routine, in which the educator and learners identify a new word and use it in context as often as possible during the day
5. playing word games to extend understanding of vocabulary (e.g. exploring different meanings of the same word form, or identifying words which can be used as different parts of speech, such as *face* [noun] and *face* [verb])
6. stimulating dialogue activities such as role play and classroom dramas
7. giving learners a notebook in which to write down new and unfamiliar words
8. going beyond the medium of text and include multimedia to support vocabulary development where possible (such as films and computers) (Department for Children, Schools and Families 2008).

Conclusion

The present study investigated the relationship between receptive vocabulary skills and early literacy skills in two groups of Northern Sotho-English emergent bilingual children. This study shows that assessing receptive vocabulary in emergent bilingual children is a practical way of assessing vocabulary breath – Grade 1 learners can complete a task like the PPVT in both their L1 and in English. Furthermore, the results support existing evidence suggesting that receptive vocabulary size reliably predicts the development of early literacy skills, which are vital for the development of fluent reading and reading comprehension. In other words, measuring a learner's receptive vocabulary knowledge is not only useful in predicting reading comprehension; it could also be a useful tool for educators to identify children who are possibly at risk of not acquiring basic literacy skills, such as phoneme-grapheme correspondences.

The results of this study furthermore suggest that mother tongue education in itself does not guarantee successful literacy development and that a combination of socio-economic and educational variables (not systematically tested here) can possibly overrule the theoretical benefits of mother tongue instruction. More research should be conducted in order to establish exactly how social, educational, linguistic and cognitive variables interrelate and predict early literacy development in emergent bilingual South African learners.

If low vocabulary levels in emergent bilingual children are not actively addressed in the South African educational context, children will be trapped in a vicious circle. Learners who cannot comprehend more advanced texts will give up attempting to read such texts. As a result, vocabulary knowledge will not be extended, and reading comprehension will remain at insufficient levels.

Acknowledgements

Competing interests

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