

Effects of Orthographic Depth on Morphological Awareness among Silozi–English Bilingual 6th Graders in Zambian Primary Schools

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ABSTRACT

Previous research has shown that the transparency of the language used for instruction influences how quickly learners acquire reading skills. Children who are immersed in languages with transparent orthographies tend to acquire reading skills faster and encounter fewer difficulties compared to those learning to read in languages with opaque orthographies. The goal of this study was to examine how the depth of orthography affects the acquisition of morphological awareness skills among Silozi-English bilingual students in the 6th grade. Given that Silozi orthography is more transparent than English orthography, it was expected that 6th graders would have significantly stronger morphological awareness skills in Silozi compared to English, as seen in other aspects of the reading process. In a quasi-experimental design, we assessed the derivational and decomposition skills of 120 participants using equivalent Silozi and English measures of morphological awareness in a primary school located in the Mongu District of Zambia's western province. The results reveal statistically significant differences in derivational and decomposition achievement between Silozi and English morphological awareness tasks, contradicting our expectations, as learners performed better in English compared to Silozi.

Keywords: derivational, decomposition, orthographic depth, morphological awareness, Zambia.

INTRODUCTION

The acquisition of reading skills is widely acknowledged to exhibit substantial variation depending on the level of orthographic transparency. Orthographic transparency refers to the degree to which a written language adheres to consistent grapheme-phoneme correspondences (Goswami, 2005; Kaani, 2021; Ziegler & Goswami, 2005). In shallow orthographies, where the relationship between graphemes and phonemes is straightforward, pronunciation is facilitated by direct manipulation of the letter-sound system. Conversely, deep orthographies present significant challenges due to irregularly spelled words (e.g., *church*), which cannot be read accurately without prior knowledge or explicit instruction (Snowling & Hulme, 2004). Consequently, beginning readers exposed to transparent orthographies, such as Finnish, tend to acquire reading skills more effortlessly and encounter fewer difficulties compared to those taught in more opaque orthographies, such as English (Seymour et al., 2003; Ziegler et al., 2010).

The Role of Morphological Awareness in the Reading Process

Research has demonstrated that the development of reading skills, encompassing phonemic awareness,

phonics, fluency, vocabulary, and comprehension, is contingent upon the level of orthographic transparency in the language employed for instruction (Joshi et al., 2023; Joshi & Aaron, 2013; Kaani et al., 2022; Ziegler et al., 2010). Despite the significance of morphological awareness in understanding and manipulating smaller units of language, such as prefixes, base words, and suffixes, for forming complex word forms, it is often neglected in the acquisition of reading, writing, and spelling abilities (Apel & Lawrence, 2011; Wolter & Pike, 2015). Evidence suggests that effective instruction in morphology is essential as early as the first grades, although it has traditionally been emphasized during middle and high school (Carlisle, 2010).

To illustrate the importance of morphological awareness, Carlisle (2010) conducted a study in which fourth, sixth, and eighth-grade students were asked to generate derived forms of base words and identify base words of derived forms. For instance, participants were required to derive *warmth* from the base word *warm* or decompose *dangerous* into the word *danger*. The findings indicated that participants were more successful in providing base words when given derived forms than in providing derived words when given base forms. Older students performed better than younger students but encountered difficulties with word conversions involving phonological changes, such as *admit* to *admission*.

Middle-school students exhibited weaker oral production skills when producing derived forms of words with both orthographic and phonological changes (e.g., *decide* to *decision*) compared to words with transparent phonology and orthography (e.g., *enjoy* to *enjoyment*), purely phonological changes (e.g., *magic* to *magician*), or purely orthographic changes (e.g., *day* to *daily*). In light of the aforementioned findings, it is postulated that the depth of orthography may have disparate effects on learners who are exposed to orthographies characterized by varying levels of transparency, such as deep versus transparent orthographies. Transparent words, exemplified by *hat* (*h/a/t*) and *sit* (*s/i/t*), can be decoded through the manipulation of grapheme-phoneme correspondences, which are characterized by small grain sizes. Conversely, more opaque words like *church* and *choir* necessitate prior knowledge of the word due to the presence of larger grain sizes. Notable scholars including Goswami (2005), Wyse and Goswami (2008), and Ziegler and Goswami (2005) have extensively discussed this phenomenon.

The effectiveness of literacy instruction, as determined by teacher competence and appropriate content, is also a significant determinant of reading proficiency (Binks-Cantrell et al., 2012; Kaani, 2021). Given that orthographic depth possesses a global influence on reading ability of beginning readers, it is reasonable to contend that the development of morphological awareness is also impacted by orthographic depth. Significantly, the impact of orthographic depth on morphological awareness development seems to be particularly pronounced during the initial stages of schooling (Lee et al., 2023; Saiegh-Haddad & Geva, 2008).

The psycholinguistic grain size theory, posited by Ziegler and Goswami (2005) as a theoretical framework elucidating the differential development of reading skills, including morphological awareness, postulates that the trajectory of morphological awareness development hinges upon the abstraction of optimal mappings between orthographic units and the sounds of a given language. Notably, substantial discrepancies in morphological awareness have been observed across the divide of orthographic depth (Casalis et al., 2015; Mousikou et al., 2020). Mousikou and colleagues assert that “deep orthographies seem to possess simple inflectional morphology (e.g., English), whereas shallow orthographies tend to exhibit complex inflectional morphology (e.g., German, Finnish, Italian, Serbo-Croatian)” (p. 3). Extensive research devoted to the development of morphological awareness has divulged that, in many instances, students deconstruct words into meaningful components in order to enrich their vocabulary and enhance reading comprehension, spelling, and writing skills (Karimi, 2012; Kieffer & Lesaux, 2007). Proficiency in discerning derivational morphemes often leads to an understanding of word meaning, thus bolstering word and text comprehension (Kieffer & Lesaux, 2012).

It has also been contended that morphological awareness is related to students’ capacity to explicate intricate

words and improve reading comprehension and writing (Carlisle, 2010). Moreover, phonological and morphological awareness skills significantly impact learners' efficacy in writing, listening, and speaking, irrespective of whether they are confronted with transparent or opaque orthographies (Kieffer & Lesaux, 2009). Morphological awareness plays a pivotal role in the development of vocabulary, as a strong understanding of derivational and decomposition morphemes contributes to enhanced writing, listening, and speaking skills (Fumero & Tibi, 2020). Consequently, language learners derive significant benefits from effectively utilizing their morphological awareness to discern word meanings, resulting in substantial improvements in literacy skills over time. Kieffer and Lesaux (2009) further underscore the importance of morphological awareness skills in supporting students' ability to identify semantic irregularities and develop a more nuanced comprehension of word meanings through the recognition of associations between root words and related prefixes and suffixes.

Moreover, morphological awareness holds considerable significance in the context of reading, writing, and spelling within agglutinative languages. This significance originates from the inherent structural characteristics of these languages, which enable the creation of numerous words by utilizing base words. For instance, in the transparent Silozi orthography, the base word *nuka* can generate a multitude of morphemes such as *kanukana*, *nukana*, *kanuka*, *linuka*, *nukanyana*, *binuka*, *sinuka*, *sinukana* and *tunukana*, among others. While not universally applicable to all English words, a similar concept can be observed in borrowed words from languages such as French and Italian. For example, the root *rupt* can be expanded to encompass terms like *disrupt*, *disruptive*, *disruption*, *rupture*, and *ruptured*.

The current study

The current study examines the significant impact of orthographic depth on reading acquisition among early readers (Goswami, 2005; Kaani, 2013; 2014, 2021; Seymour et al., 2003). Noticeable variations in phonemic awareness, letter identification, pseudo-word reading, real word reading, and comprehension have been observed across different writing systems. However, limited knowledge exists regarding the influence of orthographic depth, particularly among bilingual children in resource-limited countries such as Zambia. This study aims to investigate how orthographic depth affects reading skills at the sixth-grade level in the Mongu District of the Western Province of Zambia. The study has two objectives: (1) to compare the outcomes of decomposition reading skills between Silozi and English languages, and (2) to determine whether statistically significant mean differences exist in derivational skills between Silozi and English at the sixth-grade level in Zambia.

This study will provide valuable insights into the impact of orthographic depth on the development of reading skills in bilingual individuals. The transition from learning literacy skills in a transparent orthography such as Silozi, which has been extensively studied (Chimuka, 1978; Joshi, McBride, Kaani, & Ehederi, 2023), to the more complex and challenging English orthography (Seymour et al., 2023) is particularly relevant for sixth-grade children. Understanding how linguistic factors influence the overall reading process is crucial in this context. Moreover, the findings may guide teachers and curriculum specialists in the development of effective instructional practices and learning materials for teaching literacy skills in Zambian languages and English, with an emphasis on reading skill development. Additionally, the information generated from this study has the potential to contribute to the existing body of knowledge on reading skills in the teaching and learning of English and Silozi languages.

METHOD

Participants: The sample included 120 sixth-grade children randomly selected from two public primary schools in the Mongu District of the Western Province of Zambia. A quasi-experimental design was used to select 60 participants from each school. To ensure similar learning environments and teacher experience,

abilities, and qualifications, only students who met the following inclusion criteria were included: (1) being taught by a maximum of two teachers, (2) being below the age of 18 and not having repeated a grade, and (3) having a good command of both Silozi and English languages. Grade six students were specifically targeted for this study due to their expected proficiency in both Silozi and English languages. It is worth noting that the Zambian language policy mandates instruction in one of the seven regional local languages (Icibemba, Chinyanja, Chitonga, Silozi, KiKaonde, Lunda, and Luvale), as well as English. In the Western Province, Silozi serves as the medium of instruction. From preschool to fourth grade, students are taught in their mother tongue or the most familiar local language, while English becomes the medium of instruction from fifth grade onwards (MoE, 2013).

Data Collection Instruments: To assess students' morphological awareness skills, equivalent versions of the Test of Morphological Structure (TMS) in Silozi and English were utilized. The TMS comprises three sections: a biography section consisting of three items, a decomposition task section with 20 items, and a derivational morphological awareness section containing 18 tasks. The TMS aims to evaluate students' ability to derive and decompose morphological structures by generating new words based on morphologically related words to complete a given sentence. In the derivational MA subtest, participants are tasked with affixing prefixes and suffixes to words in order to modify their syntactic category or create new meanings. For instance, the word *do* can be transformed into *redo*, *doable*, *undo*, and *overdo*. In the derivation task, participants are required to provide a missing word based on the root morpheme (e.g., *Sing. He is a great _____.*) The correct response is *singer*. Likewise, in the decomposition MA subtest, participants are expected to remove prefixes and suffixes from target words to create new words and meanings. For example, given the stem *Walker. How slow can she _____?* the correct response is *walk*, achieved by removing the morpheme *er*.

The original English version of the TMS underwent translation and adaptation for the Silozi language, followed by back-translation to ensure equivalence with the original versions. Additional adaptations were made to the English version to align with Zambian socio-cultural conditions. Internal consistency tests were conducted to assess the reliability of the test, and the resulting estimates fell within acceptable margins (Taber, 2018). The Cronbach alpha for decomposition morphological awareness was 0.88 and 0.65, while derivational tasks yielded 0.91 and 0.77 for the English and Silozi versions, respectively.

Data Collection Procedure: The TMS tasks were administered on-site at the study school, and the administration process adhered to rigorous testing protocols (Carlisle, 2000). Each participant was given a pencil and paper to complete the written test. The duration of the testing session varied, ranging from 45 minutes to the maximum allotted time of 60 minutes. Participants were not permitted to discontinue the test and were expected to respond to all test items on the TMS. The final scores were recorded as either 0 or 1 to indicate incorrect and correct responses, respectively. Raw scores were calculated based on the total number of correct responses for each participant.

RESULTS

Levene's statistic was used to assess the homogeneity of variance in the data, and the results indicated that the assumptions necessary for conducting inferential statistical analyses were met, $F(1,238) = 0.87, p > 0.35$. Consequently, statistical analyses were conducted to address the corresponding research questions. Table 1 presents the means and standard deviations for performance in decomposition and derivational MA. Participants exhibited higher performance in decomposition MA in English ($M = 13.13; SD = 4.16$) compared to the Silozi orthography ($M = 10.75; SD = 3.02$). Similarly, a mean difference in derivational morphological awareness performance was observed between English ($M = 7.76; SD = 4.71$) and Silozi ($M = 6.12; SD = 3.44$).

Table 1: Relationship between Silozi and English MA

Variable	M	SD	1	2	3	4
1. EDC	13.13	4.65	1.00	47.61%	17.64%	4.41%
2. EDV	7.76	4.71	0.69 **	1.00	23.04%	10.24%
3. SDC	10.75	3.02	0.42 **	0.48 **	1.00	27.04%
4. SDV	6.12	3.44	0.21 *	0.32 **	0.52 **	1.00

Note: ** Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

EDC = English Decomposition; EDV = English Derivation; SDC = Silozi Decomposition; SDV = Silozi

Derivation

Between-subject t-tests were conducted to examine mean differences in decomposition and derivational awareness. The results showed statistically significant differences in means for both decomposition ($t(119) = 5.99, p < 0.01$) and derivational awareness ($t(119) = 3.70, p < 0.01$). These findings strongly support the argument that reading abilities, such as spelling (Kaani & Joshi, 2013) and writing achievement (Kaani, 2021), vary depending on orthographic depth (Carioti et al., 2021). However, the significantly better performances in the orthographically opaque English writing system contrast with expected results (Mousikou et al., 2020; Seymour et al., 2003; Ziegler et al., 2010). This counter-intuitive finding suggests that children’s morphological awareness skills should be relatively easier to master in the more transparent Silozi (Kaani, 2013; 2014).

Pearson’s correlation analysis was conducted to evaluate the relationships between morphological awareness tasks in Silozi and English orthographies. The results are displayed in Table 1 above. The cross-orthography bivariate correlation coefficients in morphological awareness achievement among grade 6 learners between English and Silozi were statistically significant for decomposition ($r(120) = 0.42, p < 0.01$) and derivational ($r(120) = 0.32, p < 0.01$). As expected, within-orthography associations yielded considerably higher associations, with decomposition and derivational in English ($r(120) = 0.69, p < 0.01$) and in Silozi ($r(120) = 0.52, p < 0.01$), with moderate r^2 values of 48% and 27%, respectively. In contrast, the shared variances in decomposition morphological awareness across orthographies were unexpectedly low ($r^2 = 18\%$), suggesting that the amount of support that English morphological awareness skills exert on Silozi decomposition morphological awareness is quite negligible. This is another counter-intuitive finding considering the expectation that literacy skills acquired in the first language can be applied in the second language (Kim & Piper, 2019).

Variations in Morphological Awareness Errors between English and Silozi Orthographies

An analysis of errors in decomposition and derivational morphological awareness items in the orthographies provided valuable insights into the impact of orthographic depth on morphological awareness performance among bilingual students in Zambia. Contrary to expectations, the findings reveal that the processing of decomposition and derivational morphology is more difficult in the transparent Silozi orthography compared to the relatively opaque English orthography. In the English orthography, participants demonstrated errors related to extension and over-generalization, resulting in the production of non-word errors. For example, instead of substituting the target word *density* with *dense* in the sentence *The smoke in*

the room was very _____ (density), most participants came up with the non-existent word densited. Similarly, in the sentence The actor would achieve much _____ (famous), where the expected correction is to replace famous with fame, the participants commonly responded with famouses.

In Silozi orthography, decomposition errors were predominantly observed in the form of synonyms for the target word. For instance, the word *liketisa* to complete the sentence *Kiufi mutu yoba _____* was decomposed as *ketisa* instead of the morphologically correct decomposition *keta*. This error resulted in an incorrect English translation, which translates to English as: *Election; who do they want to elect?* Similarly, the words *Kusepahala* (to be trusted) and *Anabusepahali* (one is not trusted) as well as *Kububana* (to be famous) and *Mubapali upangile bana* posed similar decomposition difficulties. Notably, the differences in the decomposition component of MA were more apparent than the similarities.

Decomposition Errors

In English orthography, participants committed morphological processing related to extension and over-generalization resulting in non-word errors, such as: *density: The smoke in the room was very densited*. Instead of changing the target word *density* to *dense*, participants created a new non-existent word *densited*. Similarly, in this question famous: *The actor would achieve much _____ Famouses*, they were expected to change the word *famous* to *fame*; instead the participants' most frequent answer was *famouses*. In Silozi orthography, on the other hand, decomposition errors were predominantly synonyms of the target word. For example, *Liketisa: Kiufi mutu yoba _____ ketisa?* (*keta*); (English translation and correct answer: *Election; who do they want to elect?*); *Kusepahala* (to be trusted), *Anabusepaha* (one is not trusted), *Kububana* (to be famous), and *Mubapali upangile bana* were found to be significantly more difficult and challenging for the participants. Comparatively, the differences were more distinct than the similarities in the decomposition.

Derivational Errors

Furthermore, when conducting difficult tests for both the Silozi and English derivational tasks, it was observed that derivational items were more challenging than decomposition. Additionally, it was revealed that Silozi derivational had more clearly defined levels of difficulty compared to English, as depicted in Figure 1. Some examples of difficult English items that learners encountered were: *The story was quite humourbor* and *The play was a grand producece*. Similarly, learners experienced difficulty with Silozi items such as: (*Likana*) *Bashimani ni basizana ba angiwa kaku likana* (translated as *equal; Boys and girls should be treated _____ (equally)*) and *Pampili ye kiya haye ya bubeli lunduluza* (*zetuna-bigger/higher*). Overall, the distinctions between the difficulties were more pronounced in the MA derivational.

DISCUSSION AND CONCLUSIONS

The main aim of this study was to explore how orthography affects morphological awareness in the Mongu district of Zambia, specifically comparing English and Silozi languages in 6th grade. Given the significant differences in writing systems between these two languages, it was expected that there would be notable variations in academic achievement. As predicted, the results showed statistically significant differences in decomposition and derivation skills between the two languages, with English outperforming Silozi. These findings support a previous study by Kaani (2014), which also found that English performed better than Nyanja, another Zambian language used primarily in the Lusaka and Eastern regions of the country. However, it is important to note that our findings contradict the research conducted by Goswami (2003), Lander and Wimmer (2008), and Seymour et al. (2003), and do not align with the hypothesis that reading skills are easier to acquire in transparent orthographic systems, as proposed by Ziegler and Goswami (2005).

Interestingly, the differences in mean scores for cross-orthographic morphological awareness in both

derivational and decomposition skills were minimal but still statistically significant. Similar disparities have been observed in cross-national studies that examine student performance in monolingual educational settings, such as Finnish-English (Seymour et al., 2003). These unexpected findings can be attributed to the fact that Silozi is the primary language of play for most children at home and school, while English is rarely used outside the classroom in this particular region of Western Zambia (Costley et al., 2023; Kaani et al., 2022; Kula, 2006; Tambulukani & Bus, 2012). It is surprising that learners demonstrate higher morphological awareness skills in a language that is not only their weaker second language, but also one that has a unique orthographic system, which poses significant challenges to beginning readers (Seymour et al., 2003; Share, 2008).

The logical expectation would have been that children would perform better in Silozi due to its highly transparent orthography, which should facilitate the reading process more effectively than the challenging and orthographically unique English writing system (Joshi et al., 2023; Joshi & Aaron, 2013). This expectation is based on the assumption that learners would rely on self-teaching mechanisms to improve their reading outcomes (Share, 1995). Furthermore, the National Literacy Framework was developed in 2013 with the goal of using students' mother tongue to improve their English language literacy skills. However, recent findings suggest that this may not be the case (Ministry of Education-Zambia, 2013). This study, as well as research by Kaani and Joshi (2013), reveals that learners in local Zambian languages are struggling with reading achievement. There are three possible reasons for this: the Peter Effect (Kaani, 2018; Silungwe & Kaani, 2023), the John Effect (Joshi, 2010), and the Matthew Effect (Stanovich, 1986).

The Peter Effect is a theoretical framework that suggests reading teachers cannot effectively teach what they do not understand themselves. There is a general agreement that a significant number of learners' reading difficulties, including poor morphological awareness, can be attributed to inadequate classroom instruction caused by teachers' lack of knowledge in Zambia (Nkamba & Kanyika, 2000). Studies by Kaani (2018) and Silungwe and Kaani (2023) highlight significant gaps in teachers' understanding of fundamental language concepts that are essential for reading (Moats, 1994; 2009). Therefore, expecting these ill-equipped teachers to produce proficient readers is unrealistic (Applegate & Applegate, 2004; Binks-Cantrell et al., 2012).

Furthermore, even when teachers are doing their best, students still face a lack of reading materials for practice, which is known as the John Effect—a theoretical framework that explains the impact of limited access to books on beginner readers (Joshi, 2010). This shortage is particularly prominent in Zambian languages, with the average book-pupil ratio being 0.29 (29 books per 100 pupils in 2019, MoE, 2020). The absence of age-appropriate books for reading practice significantly hinders the development of reading skills among young learners (Chansa-Kabali et al., 2014). Unfortunately, the available books are often direct translations of English children's literature, which not only fail to align with the Zambian context but also present stories that are unfamiliar to the intended readers (Linehan, 2004). This situation prevents children from utilizing the advantage of their mother tongue (Cummins, 2007) and orthographic transparency (Joshi et al., 2023; Kaani, 2014). It is important to note that both students and teachers primarily communicate in local dialects, with the Silozi language being the lingua franca in Mongu District.

Item difficulty analyses revealed that the Silozi language version of TMS presented significant challenges in derivational tasks compared to English. However, in the decomposition subtest, both languages exhibited lower difficulty levels, although there were a few specific challenges. Silozi had more difficult items in the decomposition subtest than English. Overall, the item difficulty scores for both languages were higher than those of the most challenging items. In other words, both Silozi and English orthographies showed varying levels of difficulty within each subtest.

Another important finding from the item difficulty analysis was that participants encountered more difficulties with derivational words than with decomposition in both languages. Decomposition and derivational skills differ in terms of their usage, with some being easier or more difficult for learners.

Decomposition tasks involve the removal of word parts, while derivation tasks involve adding a word part or morpheme. Learners performed better when breaking down and recognizing complex words with transparent relationships. For example, they excelled with words like *growth* in the sentence *She wanted her plant to _____ (grow)* and *teach* in *He was a very good _____ (with the correct response being teacher)*. However, learners struggled to generate derived words when given a base word. For instance, they had difficulties with words such as *expand* (*The company planned an expander*) and *expanded* (the correct response should have been *expansion*). Furthermore, learners also faced challenges when breaking down less transparent words, such as *famous* (*The actor would achieve much _____ (famous)*) with the correct response being *fame*).

These observed errors may be attributed to a lack of oral comprehension regarding the meanings of derived words. Additionally, these errors may have occurred when learners correctly used complex words but confused them with other complex words. During the decomposition test, learners struggled to accurately identify words with orthographic shifts, such as the transformation of *famous* to *fame*. However, there was evidence suggesting that learners' morphological knowledge assisted them in distinguishing base words when breaking them down and forming connections between words that shared the same base.

Additionally, the testing formats may have influenced learner performance, as learners had limited exposure to these types of tests. Due to gaps in orthography and morphological awareness, the majority of learners heavily relied on phonological interpretations for spelling, sometimes resulting in incorrect affix usage (de Marin, 2016). Nonetheless, improved instructions and practice could enhance learners' ability to differentiate affixes related to base words. Furthermore, we could provide additional explanations about the difficulty of items as a measure of the differences between Silozi and English decomposition. This difficulty may be attributed to challenges presented by morphological processes, especially in Silozi orthography, and the use of local academic language. The same lower performance in Silozi compared to English was observed in the derivational subtest.

To determine the relationships between the measures of morphological awareness defined by orthographic differences, we conducted correlation analysis. The results showed that correlations were high and statistically significant, but the correlations within language orthographies were stronger than those between language orthographies. Typically, measures of decomposition and derivational skills across languages are expected to have a higher correlation, but this study found otherwise. Measures of complementary skills across languages showed a higher association for Silozi-English decomposition compared to Silozi-English derivational achievement. If the languages were not orthographically different, we would have expected a higher correlation for measures of complementary skills. Interestingly, within-language correlations were stronger than between-language correlations, suggesting limited overlap in complementary skills across languages.

The effect size revealed the magnitude of the difference between derivational and decomposition skills across languages. The hierarchical linear regression analysis showed that the inclusion of morphological awareness in Silozi decomposition and derivation explained an additional 18% of the variance in learners' ability with English decomposition words. In the context of English derivation, the two variables accounted for an additional 24% of the variance in learners' ability to derive English words.

The results also showed that the inclusion of morphological awareness in English decomposition and derivation contributed 25% to Silozi decomposition and 10% to Silozi derivational skills, which was higher than the contribution of other variables in enhancing learners' abilities to decompose and derive words. However, the contribution of morphological awareness in other variables was determined using linear regression analysis. It can be argued that these percentages could potentially increase with explicit morphological awareness instruction. Both decomposition and derivational processes were found to be significant in all regression models, highlighting their importance in effective text generation (word retrieval

and sentence construction) during writing. Morphological awareness facilitates decomposition and derivational processes by encouraging children to pay attention to smaller meaningful units within words and their changes. Despite the students' relatively stronger performance in English derivational and decomposition compared to Silozi derivation and decomposition, a significant discrepancy was observed. Silozi is mainly used in the hinterland of Mongu District, so it was expected that the participants would perform better in both derivational and decomposition tasks with Silozi words. However, the findings did not support this expectation. In this study, learners demonstrated better performance in English. This is not entirely surprising, considering that the study was conducted in schools within a cosmopolitan township where most parents prefer sending their children to private pre-schools to learn good spoken English before attending public primary schools.

In conclusion, this study's findings underscore the importance of incorporating Silozi decomposition and derivation with the help of morphological awareness to enhance learners' skills with English decomposition words, among other factors. Moreover, the results highlight the significance of morphological awareness intervention in English derivation, which contributes to learners' proficiency in deriving words. The findings also suggest the potential for explicit morphological awareness instruction to play a more prominent role. Both decomposition and derivational processes are crucial for effective text generation, emphasizing their importance in writing. Morphological awareness facilitates these processes by promoting attention to smaller meaningful word units and their transformations. Despite the students' overall stronger performance in English derivational and decomposition tasks, there was a noticeable discrepancy compared to Silozi tasks. This unexpected finding may be attributed to the English language's prominence in the studied townships, where parents prioritize their children attending private pre-schools to learn English before transitioning to public primary schools, where Silozi is the language of instruction.

REFERENCES

1. Apel, K., & Lawrence, J. (2011). Contributions of MA skills to word-level reading and spelling in first-grade children with and without speech sound disorder. *Journal of Speech, Language & Hearing Research, 54*, 1312–1327.
2. Applegate, & Applegate, M. (2004). The Peter Effect: Reading Habits and Attitudes of Preservice Teachers. *The Reading Teacher, 57*(6), 554–563.
3. Berninger, V. W., Abbott, R. D., Vermeulen, K., & Fulton, C. M. (2006). Paths to reading comprehension in at-risk second-grade readers. *Journal of Learning Disabilities, 39*(4), 334–351.
4. Binks-Cantrell, E., Washburn, E. K., Joshi, R. M., & Hougen, M. (2012). Peter Effect in the Preparation of Reading Teachers. *Scientific Studies of Reading, 16*(6), 526–536. <https://doi.org/10.1080/10888438.2011.601434>
5. Carioti, D., Masia, M. F., Travellini, S., & Berlinger, M. (2021). Orthographic depth and developmental dyslexia: A meta-analytic study. *Annals of Dyslexia, 71*(3), 399–438. <https://doi.org/10.1007/s11881-021-00226-0>
6. Carlisle, J. F. (2000). Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing: An Interdisciplinary Journal, 12*(3), 169–190.
7. Carlisle, J. F. (2010). An integrative review of the effects of instruction in MA on literacy achievement. *Reading Research Quarterly, 45*(4), 464–487.
8. Casalis, S., Quémart, P., & Duncan, L. G. (2015). How language affects children's use of derivational morphology in visual word and pseudoword processing: Evidence from a cross-language study. *Frontiers in Psychology, 6*. <https://doi.org/10.3389/fpsyg.2015.00452>
9. Chansa-Kabali, T. (2023). An overview of home and parental factors associated with child nurturing care, stimulatory behaviors, and child outcomes in rural communities in Zambia. *Journal of Early Childhood Research, 21*(1), 3–17. <https://doi.org/10.1177/1476718X221125584>
10. Chansa-Kabali, T., Serpell, R., & Lyytinen, H. (2014). Contextual analysis of home environment factors influencing the acquisition of early reading skills in Zambian families. *Journal of Psychology*

- in Africa, 24(5), 410-419
11. Costley, T., Kula, N., & Marten, L. (2023). Translanguaging spaces and multilingual public writing in Zambia: Tracing change in the linguistic landscape of Ndola on the Copperbelt. *Journal of Multilingual and Multicultural Development*, 44(9), 773–793. <https://doi.org/10.1080/01434632.2022.2086985>
 12. Deacon, S.H., & Dhooge, S. (2010). Developmental stability and changes in the impact of root consistency on children’s spelling. *Reading and Writing: An Interdisciplinary*, 23, 1055-1069
 13. Fumero, K., & Tibi, S. (2020). The Importance of Morphological Awareness in Bilingual Language and Literacy Skills: Clinical Implications for Speech-Language Pathologists. *Language, Speech, and Hearing Services in Schools*, 51(3), 572–588. https://doi.org/10.1044/2020_LSHSS-20-00027
 14. Goswami, U. (2005). Synthetic Phonics and Learning to Read: A Cross-language Perspective. *Educational Psychology in Practice*, 21(4), 273–282. <https://doi.org/10.1080/02667360500344823>
 15. Gregory, R. (2007). *Psychological Testing: History, Principles and Applications* (5th Ed.). Boston, MA: Allyn & Bacon.
 16. Hartigan, J. A., & Wigdor, A. K. (1989). *Fairness in employment testing: Validity generalization, minority issues, and the General Aptitude Test Battery*. National Academies Press.
 17. Joshi, R. M. (2010). *Morphological Knowledge for Better Spelling and Richer Vocabulary*. A paper presented at the Education Service Center, Region 4. Houston, TX on April 1, 2010
 18. Joshi, R. M., & Aaron, P. G. (Eds.). (2013). *Handbook of Orthography and Literacy*. Mahwah, NJ: Lawrence Erlbaum Associates.
 19. Joshi, R. M., McBride, C. A., Kaani, B., & Elbeheri, G. (2023). *Handbook of Literacy in Africa: 24*. Cham, Switzerland; Springer. https://doi.org/10.1007/978-3-031-26250-0_12
 20. Kaani, B. (2008, July). *Reading and Spelling Development: A Cross-linguistic Comparison of Transparent and Opaque Orthographies*. A Poster presented at the 20th Biennial conference of International Society for the Study of Behavioural Development, Wurzburg, Germany.
 21. Kaani, B. (2014). *The Influence of Orthographic Opacity on Reading Development among Nyanja-English Bilinguals in Zambia: A Cross-Linguistic Study*. Texas A&M University. <https://hdl.handle.net/1969.1/153980>
 22. Kaani, B. (2021). Writing Proficiency across Diverse Writing Systems: An Evaluation of the Effects of Orthographic Depth. *Zambia Interdisciplinary Journal of Education*, 2(1), 41–56.
 23. Kaani, B. (2019). Pedagogical Content Knowledge for Initial Reading Instruction: The Peter Effect in Teacher Education in Zambia. *ZANGO: Zambian Journal of Contemporary Issues*, 33, 29–42.
 24. Kaani, B., Mulubale, S., & Mutau M. S. (2022). Effects of Orthographic Opacity on Reading Fluency among Zambian Nyanja-English Bilinguals. *International Journal on Studies in English Language and Literature*, 10(12), 1–16. <https://doi.org/10.20431/2347-3134.1012001>
 25. Kahyun Lee, K., Jang, W., Eom, J. & Pae, S. (2023). Word Reading and Word Writing Development of First Graders with and without Developmental Dyslexia: Considering Meaning Accessibility. *Communication Science and Disorders*, 28(3):492-504 <https://doi.org/10.12963/csd.23987>
 26. Kieffer, M. J., & Lesaux, N. K. (2008). The role of derivational morphology in the reading comprehension of Spanish-speaking English language learners. *Reading and Writing: An Interdisciplinary Journal*, 21(8), 783-804.
 27. Kim, Y.-S. G., & Piper, B. (2019). Cross-language transfer of reading skills: An empirical investigation of bi-directionality and the influence of instructional environments. *Reading and Writing: An Interdisciplinary Journal*, 32(4), 839–871. <https://doi.org/10.1007/s11145-018-9889-7>
 28. Kremelberg, D. (2011). *Study guide for Statistics for People who Hate Statistics*. Thousand Oaks, CA: SAGE Publications.
 29. Kula, N. C. (2006). Zambia: Language Situation. In *Encyclopaedia of Language & Linguistics* (pp. 744–745). Elsevier. <https://doi.org/10.1016/B0-08-044854-2/01674-6>
 30. Landerl, K., & Wimmer, H. (2008). Development of word reading fluency and spelling in a consistent orthography: An 8-year follow-up. *Journal of Educational Psychology*, 100, 150-161.
 31. Lee, J. W., Wolters, A., & Grace Kim, Y.-S. (2023). The Relations of Morphological Awareness with

- Language and Literacy Skills Vary Depending on Orthographic Depth and Nature of Morphological Awareness. *Review of Educational Research*, 93(4), 528–558.
<https://doi.org/10.3102/00346543221123816>
32. Lyytinen, H., Erskine, J., Tolvanen, A., Torppa, M., Poikkeus, A.-M., & Lyytinen, P. (2006). Trajectories of Reading Development: A Follow-up from Birth to School Age of Children With and Without Risk for Dyslexia. *Merrill-Palmer Quarterly*, 52(3), 514–546.
<http://www.jstor.org/stable/23096205>
 33. Margaret J. Snowling, & Hulme, C. (2004). *The Science of Reading: A Handbook*. Blackwell Publishing.
 34. Moats, L. C. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing: An Interdisciplinary Journal*, 22(4), 379–399. <https://doi.org/10.1007/s11145-009-9162-1>
 35. Moats, L. C. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of Dyslexia*, 44(1), 81–102. <https://doi.org/10.1007/BF02648156>
 36. Mousikou, P., Beyersmann, E., Ktori, M., Javourey-Drevet, L., Crepaldi, D., Ziegler, J. C., Grainger, J., & Schroeder, S. (2020). Orthographic consistency influences morphological processing in reading aloud: Evidence from a cross-linguistic study. *Developmental Science*, 23(6).
<https://doi.org/10.1111/desc.12952>
 37. Ndeleki, B. (2015). *Teachers' Perception on the use of Local Language as Medium of Instruction from Grades 1 to 4 in Selected Private Schools of Lusaka*. Masters dissertation, University of Zambia.
 38. Saiegh-Haddad, E., & Geva, E. (2008). Morphological awareness, phonological awareness, and reading in English–Arabic bilingual children. *Reading and Writing: An Interdisciplinary Journal*, 21(5), 481–504. <https://doi.org/10.1007/s11145-007-9074-x>
 39. Seymour, P. H. K., Aro, M., Erskine, J. M., & collaboration with COST Action A8 network. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, 94(2), 143–174. <https://doi.org/10.1348/000712603321661859>
 40. Seymour, P., Aro, M., & Erskine, J. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, 94, 143–174.
 41. Share, D. L. (2008). On the Anglocentricities of current reading research and practice: The perils of overreliance on an “outlier” orthography. *Psychological Bulletin*, 134(4), 584–615.
<https://doi.org/10.1037/0033-2909.134.4.584>
 42. Taber, K. S. (2018). The Use of Cronbach’s Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48(6), 1273–1296.
<https://doi.org/10.1007/s11165-016-9602-2>
 43. Tambulukani, G., & Bus, A. G. (2012). Linguistic Diversity: A Contributory Factor to Reading Problems in Zambian Schools. *Applied Linguistics*, 33(2), 141–160.
<https://doi.org/10.1093/applin/amr039>
 44. Wimmer, H., & Goswami, U. (1994). The influence of orthographic consistency on reading development: Word recognition in English and German children. *Cognition*, 51(1), 91–103.
 45. Wyse, D., & Goswami, U. (2008). Synthetic phonics and the teaching of reading. *British Educational Research Journal*, 34(6), 691–710. <https://doi.org/10.1080/01411920802268912>
 46. Ziegler, J. C., & Goswami, U. (2005). Reading Acquisition, Developmental Dyslexia, and Skilled Reading across Languages: A Psycholinguistic Grain Size Theory. *Psychological Bulletin*, 131(1), 3–29. <https://doi.org/10.1037/0033-2909.131.1.3>
 47. Ziegler, J. C., Bertrand, D., Tóth, D., Csépe, V., Reis, A., Faísca, L., Saine, N., Lyytinen, H., Vaessen, A., & Blomert, L. (2010). Orthographic Depth and Its Impact on Universal Predictors of Reading: A Cross-Language Investigation. *Psychological Science*, 21(4), 551–559.
 48. Ziegler, J., & Goswami, U. (2005). Reading acquisition, developmental dyslexia, and skilled reading across languages: A psycholinguistic grain size theory. *Psychological Bulletin*, 131(1), 3–29.