ENGLISH MORPHOLOGICAL AWARENESS AND READING COMPREHENSION IN DEAF AND HEARING GRADE 3 TO 7 LEARNERS FROM LESOTHO

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Plagiarism Declaration

I, Puleng Tšehla (student number g22t2726), hereby declare that this thesis is my original work and has not, in its entirety or part, been submitted to any university for a degree.

Signed: *P. Tšehla* Date: 30/11/2023

Dedication

This thesis is dedicated to my late father, ‘Muso Joseph Tšehla. Thank you, Ntate, for all your sacrifices supporting my academic journey. Our shared love for the Deaf community has inspired every single page of this thesis. Even though you are no longer physically with us, your memory and influence will forever guide my life.

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Abstract

There is a noticeable literacy crisis observed in both Deaf and hearing learners from Lesotho. This study investigates the English Morphological Awareness and reading comprehension of 26 Deaf and 82 hearing learners enrolled in grades 3 to 7 in two schools in Lesotho. This study employs a correlational cross-sectional quantitative design. Each participant completed two literacy assessment tasks: a reading comprehension task and a Morphological Awareness task. The Morphological Awareness task encompassed five subtasks that assessed the learners' inflectional, derivational, and compound awareness. The results of these assessments are analysed through appropriate statistical analyses. In addition, errors made by the Deaf and hearing learners on the literacy assessments are compared and analysed. This analysis determines the types of errors made by each group and identifies the factors that influence these errors. The performance of both groups in terms of task scores, in general, was low. Deaf learners and hearing learners' performance on the tasks was similar. This outcome contradicts most previous studies, which indicate that Deaf learners typically exhibit lower levels of Morphological Awareness development and reading comprehension compared to their hearing counterparts. The results of this study also suggest that there is a statistically significant relationship between Morphological Awareness and reading comprehension in both groups. Finally, Deaf and hearing learners made similar errors on the tasks. There was some evidence of influence from both the Deaf and hearing learners' first languages (Sesotho and Lesotho Sign Language, respectively). The study demonstrates the need for more explicit morphological instruction to improve both Deaf and hearing learners' literacy.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ASL	American Sign Language
BSL	British Sign Language
ELL	English Language Learners
ISL	Israeli Sign Language
L1	First Language
L2	Second Language
LSL	Lesotho Sign Language
MA	Morphological Awareness
PA	Phonological Awareness
SD	Standard Deviation
SASL	South African Sign Language

Chapter 1: Introduction

1.1 Overview

This study explores written English Morphological Awareness (MA) in Deaf[1] and hearing Grade 3 to 7 learners from Lesotho and the relationship between the learners' MA and reading comprehension ability. This research primarily falls within the field of Psycholinguistics of Literacy, with the inclusion of Sign Language Linguistics.

This chapter explains the motivation behind conducting this study (1.2). It also discusses approaches to education for Deaf and hearing learners in Lesotho (1.3). It is essential to include this section because there have been diverse policies and practices for teaching Deaf learners during the course of recent history, so it is necessary to establish how Deaf learners in Lesotho are taught. Additionally, it is essential to include this section as the policies for educating hearing learners vary across different countries, necessitating the inclusion of contextual information. Moreover, the chapter discusses different metalinguistic skills that underpin successful reading to provide a rationale for selecting MA as the metalinguistic skill investigated in the study (1.4). Research questions are also presented in this chapter (1.5), as well as a thesis outline that gives an overview of the content covered in the subsequent parts of this thesis (1.6).

1.2 Motivation for the Study

Lesotho is a small, mountainous country surrounded by South Africa. It has a population of about 2.2 million people and is regarded as one of the most underdeveloped countries globally (WFP, 2022). Like South Africa, Lesotho is facing a literacy crisis affecting both Deaf and hearing learners. The recent implementation of a policy in Lesotho prohibiting learners from failing and repeating grades has caused a noticeable decline in learners' literacy development (Moea, 2022; Phosisi, 2019). Leenknecht et al. (2021) show that only 6% of Grade 3 and 9% of Grade 4 learners in Lesotho have the expected English reading skills. However, this data is for hearing learners. According to my knowledge, there is currently no publicly available data on the literacy

[1] In this thesis, the term "Deaf" with a capitalised "D" is used to denote the socio-cultural and linguistic group of people who are deaf; "deaf" with a lowercase "d" on the other hand, is used to refer to the medical or audiological condition of deafness (Kinsman & Academy, 2014; Morgan, 2014; Stander & Mcilroy, 2017).

performance of Deaf learners in Lesotho. English is used as the language of instruction for both Deaf and hearing learners in Lesotho at the primary school level.

Literacy development in hearing learners of English has been extensively researched worldwide (Shimron, 2005). However, literacy among Deaf learners has received considerably less attention. Due to their lack of access to spoken language instruction, Deaf learners in Lesotho are often perceived as having a double disadvantage: being in a country where literacy development is poor and their deafness, which further hinders their literacy development (see Trussell & Easterbrooks, 2017), is seen as a second disadvantage. Thus, I am motivated to investigate the literacy development of Deaf learners compared with hearing learners to determine if Deaf learners are indeed at a double disadvantage compared to hearing learners and whether a different modality places them at a disadvantage relative to hearing learners.

Numerous studies have demonstrated that MA contributes to the development of learners' literacy skills (Carlisle & Feldman, 1995; Deacon & Kirby, 2004; Kuo & Anderson, 2006; Levesque & Deacon, 2022; Nagy et al., 2003; Nunes et al., 2006). MA has recently begun to receive scholarly attention as it has been proven to have a significant effect on reading comprehension across different languages globally, even after controlling for other relevant metalinguistic skills (Desrochers et al., 2018; Pan et al., 2016). However, MA is under-explored in Deaf literacy research. To the best of my knowledge, no research has been conducted on MA in both Deaf and hearing learners from Lesotho. Research on this topic has primarily been conducted in the Global North (Breadmore et al., 2012; Gaustad et al., 2002; Uğurlu et al., 2020; Trussell & Easterbrooks, 2017). Hence, my motivation to investigate the MA of both the Deaf learners and hearing learners.

1.3 Approaches to Education for Deaf and Hearing Learners in Lesotho

Educators for Deaf learners use different approaches, including the Oral/Aural approach, the Total Communication approach and the Sign Bilingualism approach (Gárate et al., 2016). Before discussing these approaches, it is essential to note that there are different levels of deafness which influence the instructional approach educators employ. The Global Burden of Disease Expert Group on Hearing Loss (Stevens et al., 2013) identified six different categories of hearing impairment/deafness, which are presented in Table 1.

Table 1: Hearing impairment categories as recommended by the Global Burden of Disease Expert Group on Hearing Loss (Source: Stevens et al., 2013: 147)

Hearing impairment category	Better ear hearing level (dBHL)	Hearing in a quiet Environment	Hearing in a noisy environment
Unilateral	<20 in the better ear; 35 in the worse ear	Does not have problems unless sound is near poorer hearing ear	May have real difficulty following/taking part in a conversation
Mild	20–34	Does not have problems hearing what is said	May have real difficulty following/taking part in a conversation
Moderate	35–49	May have difficulty hearing a normal voice	Has difficulty hearing and taking part in conversation
Moderately Severe	50–64	Can hear loud speech	Has great difficulty hearing and taking part in conversation
Severe	65–79	Can hear loud speech directly in one's ear	Has very great difficulty hearing and taking part in conversation
Profound	80–94	Has great difficulty hearing	Cannot hear any speech

Note: Hearing impairment categories are defined using the better ear hearing threshold in decibels averaged over frequencies 0.5, 1, 2 and 4 kHz (dBHL).

Hearing aids and cochlear implants can enhance individuals' ability to perceive more speech sounds. Nevertheless, the efficacy of hearing aids differs among individuals, and a significant number of people with hearing loss choose not to use them (Breadmore, 2007). Also, cochlear implants are very expensive and unlikely to be affordable by most families with Deaf children in Lesotho. Although hearing tests were not conducted on the learners in this study, my observation during data collection suggests that the learners have moderate to profound hearing loss.

As previously indicated, there are different approaches for instructing students with varying levels of deafness. The Oral/Aural approach focuses on intensive training of Deaf children to exclusively use spoken language to communicate (Breadmore, 2007). The approach prioritises the use of hearing aids and cochlear implants to assist in the acquisition of spoken language abilities (Gárate et al., 2016). The Oral/Aural approach proved ineffective for learners who are profoundly deaf because they had no access to the mode of oral communication although there are still many institutions worldwide who subscribe to this approach (Anglin-Jaffe, 2013; Ganiso, 2016). The Total Communication approach was designed to be an advance and cater for the learners' needs as it employs different methods of communication, such as speaking, lip reading, signing exact English, fingerspelling and listening through amplification technology (Gárate et al., 2016). Nevertheless, the learners still struggle to understand the English they receive, and the signed exact English and fingerspelling proved to be inefficient (Ganiso, 2016). The Sign Bilingualism approach, in contrast, aims to improve the learners' proficiency in both languages (spoken and signed language) as well as to develop their bicultural competency (Breadmore, 2007). This approach emphasises access to spoken language through writing (Plaza-Pust & Morales-López, 2008). It is regarded as the most effective method as it comprehensively encompasses both sign language and spoken language (Menéndez, 2010; Storbeck, 2000).

Deaf learners who wear hearing aids or have cochlear implants are often educated in a mainstream setting. In Lesotho, however, this is less frequently the case because many people do not have the financial means for cochlear implants. The Deaf community largely favours inclusive schools and schools that cater specifically to the Deaf. There are four schools in Lesotho that accommodate Deaf learners: two inclusive schools and two schools exclusively for Deaf learners. In inclusive schools, learners receive oral instruction, and a Lesotho Sign Language interpreter is present to interpret lessons for Deaf learners. Deaf schools employ the Total Communication approach and maintain small class sizes, with a maximum of 10 learners per grade. This study focuses on a Deaf school where learners are taught using a combination of Lesotho Sign Language, signing in exact English, fingerspelling and lipreading, drawing on the Total Communication approach. Unfortunately, the limited exposure to Lesotho Sign Language among Deaf learners due to this approach hinders their development in literacy (Matlosa, 2010).

There are two official languages in Lesotho: Sesotho and English. According to the Lesotho Curriculum and Assessment Policy (2008), home languages (including other languages besides the two official languages) are to be used as the primary language of instruction from Grades 1 to 3. On the other hand, English should be taught as a subject at each grade level. However, some schools, including the hearing school attended by my hearing participants, do not adhere to this guideline. The hearing participants' school deviates from this by not instructing the learners in Sesotho, their first language, from grades 1 to 3. English is used as a medium of instruction from grade 1 in this school, while Sesotho is taught as a subject.

The Deaf community in Lesotho uses Lesotho Sign Language (LSL) for communication. LSL is their first language. When enrolled in schools, Deaf children are taught to read and write in English from Grade 1 because LSL does not have a writing system. They learn English as a second language through a written medium without any oral language input. This conflicts with the official policy that home languages be used for instruction in grades 1 to 3 in that the learners' home language, LSL, is not used for instruction.

1.4 Metalinguistic skills which underpin successful reading

Literacy involves contextualised comprehension skills built into disciplinary practices (Frankel et al., 2016). Several metalinguistic skills underpin successful reading. These include Oral Reading Fluency, Vocabulary Knowledge, Phonological Awareness, and Morphological Awareness (Pretorius, 2011; Spaull et al., 2020; Wolf, 2008).

Oral Reading Fluency refers to the ability to read orally with speed, accuracy, appropriate expression and comprehension (Norton & Wolf, 2012). Several language processes and contextual factors influence fluency in reading. Oral Reading Fluency develops in conjunction with other literacy processes, such as writing, speaking, and listening (Frankel et al., 2016). This skill is under-researched in the African context. However, the limitations of my research context prevent me from exploring this skill. It is problematic to assess Deaf learners' oral reading fluency as speech is not their primary communication modality. Deaf learners cannot access spoken language phonology and use sign language to communicate. Consequently, measuring their reading fluency

would involve self-reported silent reading, which poses difficulties in control. In contrast, MA can be measured through a written format, allowing for a more reliable assessment.

Vocabulary Knowledge is the understanding of meanings associated with individual words, combinations of words, or characters (Dong et al., 2020). This knowledge enables the interpretation of texts and supports the cognitive abilities required for advanced reading processes (Dong et al., 2020). Vocabulary Knowledge has a significant impact on reading comprehension abilities (Sidek & Rahim, 2015). Numerous studies have demonstrated a noteworthy correlation between Vocabulary Knowledge and MA (Asaad et al., 2022; Mcbride-chang et al., 2005; Spencer et al., 2015). According to Rabadi (2019), several studies have suggested that learners learning English as a second language employ morphological clues as a strategy to decode the parts of new words to assist them in understanding their meaning. Also, MA is one way to help these students acquire new words because it helps them in deriving word meanings (Wysocki & Jenkins, 1987).

Phonological Awareness (PA) refers to the ability to understand that speech can be divided into smaller sound units, including words, syllables, onsets and rimes, and phonemes (Anthony et al., 2005). It also refers to the ability to recognise and manipulate phonemes in words (Anthony et al., 2005). For example, if a person understands that the word *rat* starts with the sound /r/ and that replacing the /r/ with /f/ results in the word *fat*, it indicates their awareness of the phonemes /r/ and /f/. Furthermore, this also indicates that they can manipulate sounds to create new words. Studies suggest that PA plays a crucial role in word reading (Schaefer & Kotzé, 2019) and that it is one of the strongest predictors of the early development of literacy in several languages (Hulme et al., 2015; Wilsenach, 2013, 2019). The Deaf face difficulties using letter-to-sound conversion due to their restricted access to phonological input. This has led to much research being done on PA in Deaf literacy (Clark et al., 2011; Stetler, 2020; Webb & Lederberg, 2014) in comparison to Deaf literacy and other metalinguistic skills. Some researchers argue that PA is crucial for reading development (Dyer, 2003; Wang et al., 2008), while others do not see it as necessary (Allen et al., 2009; Izzo, 2002; Narr, 2008) because Deaf readers without functional hearing cannot hear sounds and thus cannot identify and manipulate speech sounds.

There has been less investigation into MA in Deaf learners than PA, as previously mentioned. MA, which is the topic of this thesis, refers to the conscious understanding of the smallest meaningful units (morphemes) of a language, including derivational morphemes (such as *-er/-or*, *-tion, un-, re-)*, inflectional morphemes (such as *-ed, -s, -ing, -est*) and compounds (such as *blackboard*, *sunflower*, *grandfather*) (Oz, 2014). MA is described in more depth in Chapter 2 (section 2.2). MA relates to meaning because, as mentioned, morphemes are meaningful units in a language. MA enables learners to break words down into smaller, meaningful components and thus infer their meaning, making text comprehension easier (Rothou & Padeliadu, 2015). Research on written English shows that there is a connection between a learner's MA and their reading comprehension ability (Carlisle, 2000; Carlisle & Feldman, 1995; Deacon & Kirby, 2004; Kuo & Anderson, 2006; Nagy et al., 2003; Wysocki & Jenkins, 1987).

Research on Deaf literacy shows that Deaf readers experience severe literacy difficulties (Gaustad et al., 2002) and tend to lag behind their hearing peers (Breadmore et al., 2012). Deaf learners may access written text in a similar way to hearing students learning English as a second language. However, the processes differ because hearing learners learn to speak English before or concurrently with learning to read it. In contrast, Deaf learners only learn English through writing without the benefit of phonological cues or hearing everyday language usage. This study provides an advantage in that it allowed me to explore the role of MA without interference from the phonological cues that hearing learners would receive when learning the language.

1.5 Research Questions

This thesis seeks to answer the following research questions:

1. How strong is the English Morphological Awareness of Deaf and hearing Grade 3 to 7 learners in Lesotho relating to:
    a) inflectional morphology
    b) derivational morphology
    c) compound morphology?

2. How does written Morphological Awareness contribute to the English reading comprehension of Deaf and hearing Grade 3 to 7 Learners in Lesotho?

3. What types of errors do Deaf and hearing learners make on tasks of Morphological Awareness?

1.6 Outline of the Thesis

In order to address the research questions and provide a thorough account of how the study was conducted, this thesis is divided into six chapters (including the current chapter). Presented below is a summary of the content covered in each chapter.

Chapter 2: *Literature Review*. This chapter provides an overview of current knowledge and scholarly contributions pertaining to the topic of the present study: MA and reading comprehension in both Deaf and hearing learners. It explains MA and the three types of morphological relations: inflectional morphology, derivational morphology and compound morphology. This chapter also describes sign language morphology and compares the morphological systems employed in English, Sesotho, and LSL.

Chapter 3: *Methods*. This chapter presents details regarding the participants involved in the study and the research site. Additionally, it provides a clear description of the methodology employed for collecting data. The chapter also provides a comprehensive description of the tasks conducted in the study and the rationale for selecting these specific tasks.

Chapter 4: *Results*. The results obtained by the participants on the MA and reading comprehension tasks are presented in detail and analysed in this chapter.

Chapter 5: *Discussion*. In this chapter, the results reported in Chapter 4 are linked to the research questions presented in Chapter 1. The research questions are answered by analysing the findings obtained in this study.

Chapter 6: *Conclusion*. This chapter discusses the main findings of this research, including its conclusion that Deaf and hearing learners in this study have a relatively weak MA. The limitations

and implications of the study are also explored. Additionally, the chapter highlights recommendations for further research, including implementing explicit morphological instruction to improve Deaf and hearing learners' literacy development.

1.7 Chapter summary

This chapter has provided the motivation behind the chosen topic. The chapter showed that this type of comparative study has yet to be investigated in the context of Lesotho. It also described the education system in Lesotho, highlighting the different approaches to teaching hearing and Deaf learners. Hearing learners are instructed through an oral approach. In contrast, Deaf learners are taught using the Total Communication approach that purportedly accommodates the learners' needs but fails to do so, as evidenced in the upcoming sections of the thesis. The chapter also reported on the different metalinguistic skills and their contribution to literacy. Based on this chapter, it is evident that this research presents an opportunity to examine the extent to which hearing and Deaf learners from an underprivileged context have acquired MA and its role in reading comprehension for both groups.

Chapter 2: Literature Review

2.1 Overview

This chapter describes MA and the three types of morphology: inflectional morphology (2.2.1), derivational morphology (2.2.2), and compound morphology (2.2.3). To better understand these constructs and the level of awareness both Deaf and hearing learners possess, the chapter reviews relevant literature from previous studies. Doing so enables us to determine whether the findings of this study align with those of other researchers in the field. Moreover, the chapter discusses the relationship between English MA and reading comprehension in Deaf and hearing learners (2.3 and 2.4). It draws on insights from previous research to determine whether this study yields similar or contradictory results.

Furthermore, the chapter discusses Sign Language morphology and its morphological constructs: inflectional morphology (2.5.1), derivational morphology (2.5.2), compounding morphology (2.5.3), and classifiers (2.5.4). These are important to discuss as they help us understand how morphology works in a language with a different mode from English. The chapter also compares the morphological systems employed by English, Sesotho, and LSL (2.6). As indicated in the introduction chapter (1.3), Sesotho and LSL are the participants' first languages (respectively), while English is their language of learning and the language this study is investigating. Comparing the morphological processes in these languages allows us to determine whether there is any influence or transfer from the participants' L1 morphology to their English MA. The chapter concludes by outlining key points from the chapter (2.7).

2.2 Morphological Awareness

MA is the ability to recognise and manipulate morphemes and morphemic structures within a language (Carlisle, 2003; Kuo & Anderson, 2006; Mcbride-chang et al., 2005). Morphemes are the smallest units that carry meaning in a language (Carlisle, 2003). For example, the word *boys* contains two morphemes: the root noun *boy* and the plural suffix *-s*. Research indicates that Deaf learners face challenges in acquiring MA, which ultimately results in delayed development of their MA skills compared to their hearing peers (Gaustad et al., 2002; Gaustad & Kelly, 2004; Trussell & Easterbrooks, 2017). The development of MA in English is believed to be influenced by

exposure to both spoken and written forms of the language (Deacon et al., 2023; Kirby et al., 2012). While Deaf learners are exposed to written English, they do not have access to oral English exposure, which could delay their MA development compared to hearing learners. Based on this, I hypothesise that Deaf learners in this current study will show lower levels of MA compared to hearing learners.

There are three types of morphology that have different impacts on reading: inflectional morphology, derivational morphology, and compound morphology. Understanding these different relations is critical to understanding their impact on reading. In the following sub-sections, I discuss each morphology and the insights gained from research on their role in the development of MA in learners.

2.2.1 Inflectional morphology

Inflectional morphology involves altering the grammatical function of a word without changing its grammatical class (Kirby et al., 2012). For example, the word form *laughed* (verb) is created by adding the suffix *-ed* to the base morpheme *laugh* (verb). Research conducted on first language English speakers demonstrates that inflectional morphology can be manipulated early in childhood (Carlisle, 2003; Clark, 1993; Zhang & Koda, 2013). In the classic Berko (1958) 'Wug' experiment, children between the ages of 4 and 7 completed a task investigating their awareness of English inflectional morphology. They were presented with pictures accompanied by pseudo-words and were instructed to give plurals of those words, and most children accurately completed the task. Kuo & Anderson (2006) also indicate that first language learners of several languages (English, Serbian, Turkish and Chinese) understand and can manipulate inflectional morphology by early primary school years.

As mentioned in section 1.2, limited research has been conducted on MA in Deaf learners, including comparative studies between Deaf and hearing learners' MA. In Trussell and Easterbrooks' (2017) systematic review of studies on morphological knowledge in Deaf learners, 16 studies were analysed, including Brown (1984) and Gaustad (1986). These two studies involved Deaf learners older than five years old who displayed similar knowledge of English inflectional morphology to that of younger hearing learners between the ages of one and six, highlighting a

discrepancy in the MA development between these two groups. In contrast to these findings, Gaustad and Kelly (2004) found no significant difference between the performance of Deaf and hearing learners on inflectional morphology assessment. They measured inflectional and derivational morphological knowledge in Deaf and hearing middle school and college students. In line with these findings, Breadmore et al. (2012) found that Deaf learners did not lag behind their hearing counterparts regarding their inflectional awareness. Breadmore et al. (2012) examined the spelling abilities of British learners, both Deaf and hearing, between the ages of 11 and 16, specifically focusing on their proficiency in spelling regular, semi-regular and irregular plurals. The study found that Deaf and hearing learners obtained similar results in their performance of spelling plural regular nouns. However, when it came to spelling plurals of non-words, Deaf learners outperformed hearing learners. According to Breadmore et al. (2012), the morphological generalisation abilities of Deaf learners were shown to be better compared to their reading-age-matched hearing peers. It should be noted that learners in Gaustad and Kelly (2004) and Breadmore et al. (2012) were older than learners in other studies that found a lag. This may indicate that inflectional awareness in Deaf learners develops as they grow older, and they stop lagging behind their hearing counterparts at some stage.

The research reviewed presents inconsistent findings regarding the inflectional awareness of Deaf learners compared to their hearing peers. Some studies suggest that Deaf learners demonstrate more advanced inflectional awareness than their hearing counterparts, while others indicate the opposite. Therefore, it is of significant interest to examine the performance of Deaf learners in this study and compare it to hearing learners. The results are discussed in chapter 4 (4.2).

2.2.2 Derivational morphology

Derivational morphology involves creating new words from a base morpheme that belongs to a different word class and/or has a different meaning (Kirby et al., 2012). For example, the word *dancer* (noun) is formed by adding the derivational suffix *-er* to the base *dance* (verb). Research shows that learners with various first languages tend to achieve better in English inflectional morphology than in English derivational morphology in Grades 1 to 3 (Carlisle, 1995; Carlisle, 2003; Clark, 1993; Kuo & Anderson, 2006). This is because English inflectional morphology only involves the addition of an affix to the base. In contrast, derivational morphology is more complicated in that with the addition of an affix, the meaning of that particular word changes, and

there is more knowledge that one needs in order to understand the words that are derived. After examining American kindergarten and Grade 1 English learners' (average age 5.6 years) inflectional and derivational morphology performance on tasks, Carlisle (1995) found that the learners performed better on inflectional morphology tasks than on derivational morphology tasks. Zhang and Koda (2003) reported comparable findings in a similar study on older learners studying English as a foreign language. The study revealed that Chinese learners in Grade 6, with an average age of 12.1 years, showed a greater understanding of inflectional morphology than derivational and compound morphology.

Studies show that derivational awareness has been given less attention than inflectional awareness in the literature (Cannon & Trussell, 2021; Zhang et al., 2023). However, the available research on derivational awareness indicates that Deaf learners, too, seem to encounter challenges in developing their derivational awareness (Gaustad & Kelly, 2004; Van Hoogmoed et al., 2013). In their research, Gaustad and Kelly (2004) investigated the reading ability and morphological knowledge of 19 to 32-year-old Deaf college students and 11 to 12-year-old hearing middle school students in America. Despite this sizeable age gap between the two groups, the results of this study show that hearing middle school students outperformed Deaf college students on affix meaning and derivational morphology knowledge. This indicates that Deaf learners lag behind in their development of derivational awareness compared to hearing learners (Gaustad et al., 2002; Gaustad & Kelly, 2004; Van Hoogmoed et al., 2013).

To my knowledge, no study has shown that Deaf learners perform better than hearing learners in derivational awareness. Hence, it is significant to investigate the derivational awareness of Deaf learners in this study to determine whether the results coincide with the research that suggests a delay in the development of derivational awareness among Deaf learners compared to hearing learners, or whether a different outcome might be found.

2.2.3 Compound morphology

In addition to inflectional and derivational morphology, compound morphology is another significant type of morphology in languages. Like derivational morphology, compound morphology generates new words. Compounding involves combining two or more free morphemes to form a new word (Zhang & Koda, 2013). For example, the word *toothbrush* is

formed by adding the free morpheme *tooth* to another free morpheme *brush*. Literature on the acquisition of English compounds has received comparatively less attention in comparison to studies focusing on the acquisition of English inflectional and derivational morphology (Ku & Anderson, 2003; Kuo & Anderson, 2006; Lam et al., 2012; Mcbride-chang et al., 2005; Wang et al., 2006; Zhang & Koda, 2013).

The existing body of literature predominantly focuses on the investigation of English compound awareness within the context of Chinese-English biliteracy learning (Ku & Anderson, 2003; Mcbride-chang et al., 2005; Qiao et al., 2021; Wang et al., 2006). Compound morphology is more prominent in Chinese than in English, and this prominence can be attributed to the isolating nature of the language, characterised by a limited presence of inflectional and derivational morphemes. Consequently, compounding is a viable strategy for creating new words in this language. Compound awareness in Chinese has thus attracted much interest over the years (Cheng et al., 2016; Kim et al., 2020; Lam et al., 2012; Liu et al., 2013; Xie et al., 2023). Recent studies have demonstrated the significance of compound word awareness for Chinese word reading and comprehension (Cheng et al., 2016). This relationship remains significant even after accounting for other variables (Cheng et al., 2016; Zhang et al., 2014). Similar findings have been observed in Deaf learners acquiring Chinese as a second language (Chan, 2023; Sun et al., 2022). These results align with the fact that compounding is a prominent feature of Chinese, making compound awareness crucial for adequate text comprehension. In languages where compounding is less prominent, such as English, the importance of compound awareness may be less significant for comprehension (Lam et al., 2012).

Literature suggests that Chinese-speaking English learners tend to exhibit a strong awareness in English compound awareness (Lam et al., 2012). In some cases, they outperform English monolingual learners in this aspect (McBride-Chang et al., 2005). A longitudinal study by Lam et al. (2012) investigated the development of compound awareness among Chinese-speaking English language learners aged 5 to 7 in Canada. The study aimed to investigate the contribution of MA to vocabulary and reading comprehension. The findings revealed consistent derivational and compound awareness development among Chinese-speaking English Language Learners (ELL) from kindergarten to Grade 2. MA was found to explain unique variance in vocabulary and reading

comprehension one year later. The findings also showed that derivational awareness contributed more significantly to vocabulary and reading comprehension than compound awareness.

There is a lack of research on English compound awareness among Deaf learners learning English as their second language, despite compounding being a prominent feature in sign languages. Sign languages consist of numerous individual lexemes, and certain concepts are expressed through the combination of these lexemes (see 2.5). As indicated in this chapter, L1 Chinese learners display a strong awareness of English compound words. Given that Deaf learners' first language (LSL), like Chinese, is known for its extensive use of compounding, I hypothesise that Deaf learners participating in this study will demonstrate proficiency in English compound awareness.

2.3 English Morphological awareness and reading comprehension

Research suggests that MA plays a significant role in learners' reading ability and development (Carlisle & Feldman, 1995; Deacon & Kirby, 2004; Kuo & Anderson, 2006; Levesque et al., 2021; Nagy et al., 2003; Nunes et al., 2006) beyond PA, word reading accuracy and fluency across different languages (Chan, 2023; Desrochers et al., 2018; Lee et al., 2023; Zhang et al., 2023). MA relates to meaning because morphemes are meaningful units in a language. Thus, it enables learners to break words down into smaller, meaningful components, making text comprehension easier (Rothou & Padeliadu, 2015). Findings from a study by Deacon & Kirby (2004) on English first language literacy learners in Canada suggest a significant link between English MA and reading comprehension for learners in Grades two, four, and six. This relationship between MA and reading comprehension develops with age (see Kuo and Anderson, 2006 for a review; Varga et al., 2022).

Research also shows a significant relationship between English MA and reading comprehension in learners learning English as a second language (Casalis & Louis-Alexandre, 2000; Zhang & Koda, 2013). Jeon's (2011) study examined the impact of English MA on the English reading comprehension of South Korean grade 10 learners. The learners were non-native speakers of English, and their reading comprehension was evaluated based on various factors such as phonological decoding, listening comprehension, vocabulary knowledge, passage-level reading comprehension, metacognitive reading awareness, and MA. The study found that MA, particularly

derivational morphological knowledge, was a crucial predictor of L2 reading comprehension even when other factors were considered. These results also align with the findings of Zhang and Koda (2013) and Lee et al. (2022), who showed that derivational awareness contributes more to comprehension than inflectional and compound awareness.

Some research suggests that MA not only directly contributes to reading comprehension but also has an indirect contribution via vocabulary and word reading (Kieffer & Lesaux, 2012; Levesque et al., 2021; Proctor et al., 2012; Spencer et al., 2015; Zhang & Koda, 2013). Spencer et al. (2015) found a relationship between MA and vocabulary from their two studies that sought to determine whether vocabulary knowledge and MA should be considered distinct or interconnected constructs. The researchers ascertained that the construct of MA and vocabulary could be best conceptualised as a singular factor. Their research involved Grade 4 and Grade 8 English-speaking learners. Similar results were found from English learners with different first languages. Kieffer and Lesaux (2012) revealed that the English MA of Spanish-speaking, Filipino-speaking, and Vietnamese-speaking learners, as well as that of native English speakers, significantly contributed to reading vocabulary, which in turn contributed significantly to reading comprehension. The stronger a learner's awareness of morphology, the more they can recognise new vocabulary and comprehend academic text.

Based on the research cited above, a notable correlation exists between MA and reading comprehension in hearing learners. It further highlights that derivational awareness plays a more significant role in comprehension. In section 4.3 of this study's results chapter, I demonstrate the relationship between the MA of hearing learners in this study and their reading comprehension proficiency. Additionally, I show the contributions of each morphological relation to reading comprehension to show which relation contributes more to reading comprehension.

2.4 Deaf learners' English Morphological Awareness and reading comprehension

The link between MA and reading comprehension has also been found in Deaf learners of English (Nielsen et al., 2011; Trussell, 2014; Zhang et al., 2023). Research indicates that MA in Deaf learners also shows a significant relationship with reading comprehension over and above other

language skills. Wang et al. (2016) explored the interrelationships of English phoneme detection, silent word reading fluency, MA, and reading comprehension with 45 Deaf learners from Grades 3 to 8 in the United States of America. The results of this study revealed a significant relationship between learners' MA and English reading comprehension after controlling for phoneme detection and silent word reading fluency.

As indicated in 2.3, derivational awareness contributes more to comprehension than inflectional awareness in hearing learners. Comparable findings were found in Deaf learners (Zhang et al., 2023). A noteworthy observation from a recent meta-analysis conducted by Zhang et al. (2023) is that MA assessments focused on derivation had a slightly higher correlation with reading comprehension than assessments encompassing both derivation and inflection. The findings appear to indicate that derivational awareness has a stronger relationship with reading comprehension of Deaf students than inflection awareness does.

In the preceding section (2.3), I showed that research suggests that MA in hearing learners positively affects reading comprehension directly and indirectly through its influence on vocabulary and word reading. This assertion applies to Deaf learners as well. Zhang et al. (2023) revealed a significant mean correlation between MA and both vocabulary knowledge and word reading. In addition, a significant relationship was observed between reading comprehension and both word reading (fluency) and vocabulary knowledge.

Based on these studies on Deaf learners' English MA and reading comprehension, I speculate that English MA plays an important role in the reading comprehension of Deaf learners in this study.

2.5 Sign Language Morphology

It is essential to understand that morphology functions differently in sign languages in comparison to spoken languages. This is particularly crucial for this study as it focuses on Deaf learners. Within this section, I describe the different morphological processes employed by sign languages to identify potential influences from LSL morphology to the Deaf learner's English MA.

The morphological structures of sign languages exhibit significant cross-linguistic similarity (Aronoff et al., 2005). Sign languages have two types of morphological processes: sequential and

simultaneous. Sequential word formation involves a linear arrangement of individual morphemes (Pfau, 2016). Spoken languages also employ word formation. Example (1) illustrates how sequential word formation works in South African Sign Language (SASL), English and isiXhosa.

(1) a. *SASL*

TEACH + PERSON > Teacher[2]

b. *English*

Cook > Cooked

The suffix *-ed* is added to the verb *cook* to indicate a change in tense.

c. *isiXhosa*

inja > **izi**nja

(dog) (dogs)

The plural form of the word *inja* is formed by adding *iz-*.

The signs (morphemes) in 1a and morphemes in the words in 1b and 1c occur sequentially.

In a simultaneous morphological structure, a sign's morphemes are layered simultaneously on one another instead of being joined together like in spoken languages (Aronoff et al., 2005). It is quite challenging to tell the morphemes apart in this structure than in sequential morphology. This is because it involves the presentation of grammatical features, adjectival and adverbial meaning through modifications in the base sign's direction, rhythm, or path shape rather than through the sequential addition of extra phonological segments to the word (Aronoff et al., 2005). For example Meir et al. (2010) show that in several sign languages, the sign for WRITE is commonly represented by a sign symbolising the manipulation of a long, thin tool (a pen or pencil) with one hand. Simultaneously, the other hand assumes an open palm hand shape that signifies a level surface, representing a sheet of paper in the given context (Meir et al., 2010). The simultaneous morphological structure is more common in sign languages than spoken languages.

[2] (+) indicates "and", (>) indicates "becomes"

As in spoken languages, sign language morphology can be divided into inflectional, derivational, and compounding morphology. These are discussed in sections 2.5.1, 2.5.2 and 2.5.3, respectively.

2.5.1 Sign Language inflectional morphology

Sign languages possess rich inflectional systems because these systems are not entirely arbitrary, but rather, they are driven by how "certain visuospatial concepts such as source, goal, theme, path, and the size or shape of an object" are represented (Aronoff et al., 2005: 3).

Although sign languages have rich morphological systems, they are primarily simultaneous rather than sequential, that is, they have very little affixal inflectional morphology (Aronoff et al., 2005: 3). It is possible to modify the movement of a noun, adjective, or verb (Johnston, 2005). For example, the LSL sign for WORK can be changed to convey various meanings through specific physical movements. Repeatedly executing a back-and-forth motion can indicate that work was done continuously, while a large circular movement can suggest prolonged work. Similarly, it is possible to communicate the concept of being "very sick" by employing a rapid and forceful movement in the sign SICK. These movements, which modify verbs and adjectives, are classified as bound inflectional morphemes. They are bound because they must be produced simultaneously with the free morpheme (WORK or SICK). The individual movements cannot exist independently and must be integrated or incorporated into the sign.

Facial markers also function as bound inflectional morphemes, which modify verbs or adjectives (Johnston, 2005). In many sign languages, including LSL, the adjective BIG can be expressed with additional facial cues to convey varying degrees of magnitude. For example, puffing out one's cheeks while signing the adjective BIG can indicate a sense of "very big", while a facial expression with pursed lips can suggest a more moderate size, conveying "somewhat big". These alterations modify the grammatical use of the word without changing the part of speech.

Unlike spoken language, sign languages typically do not encode tense through inflectional morphology (Pfau, 2016). In the SASL example (2) below, the sign PLAY is used similarly in both phrases. However, the adverbs YESTERDAY or TODAY convey information about time. This differs from spoken languages, including English, where information about time is often

indicated by attaching a tense inflectional morpheme to a verb, for example, *walk–walked.*

(2) SASL

a. YESTERDAY NEPHEW MINE TWO HOURS PLAY.
Yesterday, my nephew played for two hours.

b. TODAY THREE HOURS PLAY
Today, he played for three hours.

Sign languages employ complex systems of aspect inflection (Pfau, 2016). Like tense, aspect is a grammatical category connected to time. However, whereas tense indicates the time frame in which an event occurs with respect to the present moment, aspect provides information about the structure of an event itself. Essentially, aspect describes how an event unfolds through time. For example, in some sign languages including LSL, SASL and ASL, the verb LOOK-AT may take different forms to mark aspect. A signer may repeat the movement of the sign LOOK-AT to indicate that something was looked at regularly. To show that something was looked at repeatedly, a signer repeats the movement of the sign LOOK-AT in a tense manner and also holds their hand briefly in space at the end of the movement before moving it to its final position.

In most spoken languages, pluralising nouns is achieved by adding affixes, as demonstrated in 2.2.1. Sign languages operate differently. It appears that reduplication is a significant method of pluralisation across various sign languages (Pfau, 2016). This is not surprising given that using reduplication, plurality is expressed in an iconic way: a single articulation of the sign denotes a singular entity, whereas repeated articulation denotes multiple entities. In German Sign Language, for example, the sign for *children* is formed through the process of reduplication, specifically by duplicating the sign *child* (Pfau, 2016). This also holds for LSL and SASL.

Sign languages also employ inflectional morphology to express agreement (Mathur & Rathmann, 2012). Movement inflections are employed to indicate Agreement between the subject and object. In many sign languages, it has been shown that certain verb signs change their form depending on the reference of the subject and object (Mathur & Rathmann, 2012). The signs start from the

subject and moves to the object. In SASL and LSL, for example, the sign TELL shows agreement by moving from the signer to a neutral space to denote *I tell you*. In contrast, denoting *you tell me* involves a movement directed towards the signer's body. The verbs GIVE and HELP show agreement in a similar manner.

This section demonstrated that sign languages (including LSL) possess complex inflectional systems. Reduplication is a frequently employed morphological process for the expression of aspect marking and pluralisation. Moreover, it has been shown that certain verbs can demonstrate agreement with both their subject and object through their use of movement within sign languages. These morphological processes employed by sign languages differ from those in English. As a result, Deaf learners learning English may find it challenging to comprehend English inflectional morphology.

2.5.2 Sign Language derivational morphology

The process of derivational morphology in sign languages encompasses joining or attaching a derivational morpheme, whether manual or non-manual, to a free morpheme (Pfau, 2016). Sign languages use different bound morphemes to change parts of speech. For example, the verb to *sit* can be expressed by a smaller double movement, resulting in the noun CHAIR in ASL (Napoli, 2018). By changing the movement, a signer has changed the part of speech. This process of deriving nouns from verbs by modifying movement within the sign is employed in various sign languages (Pfau, 2016). In LSL, the noun CAR and the verb DRIVE are expressed using the same sign but with different movements. A single monodirectional movement represents DRIVE, while a bidirectional movement expresses CAR.

One of the notable differences between derivational morphology in sign languages and spoken languages pertains to the use of affixation. While most spoken languages employ affixation extensively, sign languages tend to rely less on affixation (Aronoff et al., 2005; Pfau, 2016). Negative affixation is an example of affixation in sign languages, although this is not common (Branchini & Mantovan, 2021; Johnston, 2006; Pfau, 2016). It involves adding a negative suffix and specific non-manual morphemes to indicate negation (De Barros & Siebörger, 2016). For example, in LSL and SASL, the word *discourage* is represented by the signs ENCOURAGE and

NOTHING accompanied by a side-to-side head shake. The negative suffix NOTHING indicates "not at all" (De Barros & Siebörger, 2016: 9).

A comparable suffix observed in sign languages is the negative suffix glossed NOT-EXIST (Aronoff et al., 2005; Napoli, 2019). In Israeli Sign Language, this negative suffix forms adjectives from nouns or adjectives (Napoli, 2019). For example, INTERESTING-I-NOT-EXIST means *uninteresting*, IMPORTANT-I-NOT-EXIST means *unimportant*, and WORTH-NOT-EXIST is used to express the idea of something not worth it. The lexical sign NEG-EXIST, from which the negative affix likely originates, shares a similar form (Napoli, 2019). A similar negative affix grammaticised from a lexical sign occurs in LSL.

Derivational morphology in LSL and other sign languages involves considerably less affixation than in spoken languages. It involves negative affixation, including the NOT-EXIST suffix. Derivational morphology in sign languages also involves movement techniques that change verbs into nouns, including reduplication. These are a few examples of many ways in which derivational morphology is expressed in sign languages. It is evident that LSL differs from English in its derivational process. As a result, I hypothesised that Deaf learners in this study encounter difficulties in completing tasks that assess their derivational awareness.

2.5.3 Sign Language compound morphology

As previously indicated in section 2.2.3, sign languages are rich in compounding. Compounds are formed by a combination of two or three free morphemes. Individually, these signs convey distinct meanings; however, when combined, their meanings change (Pfau, 2016). Most compounds in sign languages exhibit a sequential combination (see example 3), similar to the compounds seen in spoken languages.

(3) *Sign Language of the Netherlands*

FATHER + MOTHER > FATHER^[3]MOTHER (*parents*)

[3] (^) indicates compound signs

An additional example of compounding is adding the person or agent marker to a verb sign to form a noun. For instance, adding an agent marker to the sign SING changes the sign into the noun *singer*. This morpheme (agent marker) is also employed to represent PERSON. This process is found in sign languages such as American Sign Language (ASL), SASL, and LSL. In these languages, *singer* is signed as SING^PERSON.

The concept of coordinated and subordinated compounds is present not only in spoken languages but also in sign languages. In coordinated compounds, the distinct words possess equal status. In compounds of this nature, neither of the two components serves a modifying or specifying role (Pfau, 2016). Example (3) above illustrates this.

Conversely, subordinated compounds are made up of a head and a modifier, with the head determining the compound's grammatical category. This compound tends to be more common than coordinating compounds in spoken languages. In example (4) taken from Pfau (2016: 201), in ASL, the noun NAME is modified by the adjective BLACK to produce the phrase *bad reputation*.

(4) *ASL*

BLACK + NAME > BLACK^NAME (*bad reputation*)

In sign languages, compounds involve various morpho-phonological processes, such as reduction, deletion, change of movement, handshape assimilation, and spreading of the non-dominant hand (Pfau, 2016). These modifications lead to the fusion of two or more signs, forming a complex sign that takes slightly longer to produce than a monomorphemic sign (Pfau, 2016). For example, to form a sign for a *bookstore* in LSL, the sign for BOOK is modified and fused with the sign for SHOP. The sign for BOOK involves a double movement, and the sign for SHOP also involves a double movement. However, when combining the two signs to form the compound sign for "bookstore," one of the movements of the BOOK sign is dropped. Even though part of this is shortened, this sign still takes slightly longer to produce than single morpheme signs.

Compounding is quite prevalent in LSL. While there are certain instances where compounding is employed similarly to English by presenting a sequential combination of words, there are also instances where the process differs in these languages. In LSL, some signs are modified before merging with other signs, whereas it is less common for English compounds to involve phonological processes. Due to these distinctions, this study sought to establish whether LSL compound awareness has a positive or negative effect (or no effect) on Deaf learners' English compound awareness.

2.5.4 Classifiers

Classifiers are morphemes that typically stand in place of a mentioned lexical item within a given discourse (Zwitserlood, 2012). Classifiers also show an object's shape, size and movement (including an object in relation to another object). For example, a clawed hand facing downward can be used to represent a house, while an upward-facing index finger from a different hand can indicate the movement of a person passing by that house. Classifiers exist in some spoken languages, including Cherokee, but not in English (Pfau, 2016).

According to Aronoff et al. (2005), sign languages typically encompass three distinct categories of classifiers, each characterised by a specific set of handshapes. These categories include size and shape classifiers, entity classifiers, and handling classifiers. Size and shape classifiers are a type of classifiers that are used to indicate the size or shape of an object (Zwitserlood, 2012). These classifiers employ visual representations to convey the physical attributes of objects. They function as adjectives showing size, height, or shape, including characteristics such as curvature or flatness. For example, in LSL, suppose a signer is narrating a story and wants to express that they put two cups of varying sizes (one large and one small) on a table; they would use an open palm to signify the table surface and a C-shaped hand to symbolise the cups. They would contract their C-shaped hand to indicate the smaller cup and expand their C-shaped hand to indicate the larger cup.

Entity classifiers are employed to categorise referents based on their semantic category, such as a person standing upright, a seated person, a vehicle, and so forth (Aronoff et al., 2005). These classifiers also play a role in more complex constructions by combining with other classifiers (indicated by the other hand) and various movement roots that show path shapes and different

ways of movement (Aronoff et al., 2005). For example, when using LSL to communicate that a car turned on a curve, the signer would use a flat hand classifier to represent the car and a curved motion to show the car's movement. Moreover, if they want to express that the car almost bumped into a person standing at the end of the curve, they would use an index finger from their other hand to represent the person.

Handling classifiers represent the shape attributes of an item within a transitive sentence. In some sign languages, including LSL, the hand shape of the word GIVE may change based on the object being handed over. For instance, to indicate the transfer of a long and narrow object, such as a pen or a pencil, the hand shape used for GIVE may involve a classifier representing the object's shape. Similarly, a different classifier may be used for round objects like a ball or an apple.

In summary, classifiers are simplified representations of referents to which additional morphemes can be are added simultaneously to create complex constructions. The use of classifiers in LSL may negatively or positively impact the English MA of Deaf learners in this study. It may hinder their progress because English does not have classifiers, or it may give Deaf learners a heightened awareness of morphology because, in LSL classifiers, many morphemes can be produced at the same time.

2.6 Comparison of morphological processes in LSL, Sesotho and English

As indicated in Section 1.3, the learners' first languages are Sesotho and LSL, respectively. It is, therefore, necessary to compare the morphology of these languages and the language they are learning (English). According to Baker et al. (2016), it can be argued that sign languages (including LSL) exhibit the closest resemblance to an agglutinating language as many different morphemes are usually added to the base sign to convey a complex idea. Similarly, Sesotho is classified as an agglutinating language characterised by its disjunctive orthography. In contrast, English is primarily isolating, yet it also displays some fusional characteristics (Ge & Comrie, 2022). This means that words in English are not heavily inflected and do not undergo significant changes in form. However, English does exhibit some degree of fusion, where words may change their endings to indicate tense, number, or case. This section examines the different morphological processes employed by these languages.

Section 2.5 showed that sign languages use plenty of simultaneous morphological processes while making less use of sequential phonological processes than spoken language, and this holds for LSL. In contrast, spoken languages (including Sesotho and English) mainly involve sequential processes, with simultaneous processes being relatively less common. An example of a simultaneous process can be seen in English, in which stress is used to distinguish between the noun *próduce* and the verb *prodúce*. The stress is on the noun's first syllable and the verb's second syllable.

There are variations in the inflectional processes of these languages. The English language employs a plural suffix to indicate plurality. In the given example (5a), the plural form of the word "girl" is formed by appending the suffix *-s.* In Sesotho, plurality is indicated through a modification in the noun class; in example (5b), the noun class prefix *-ngo* is changed to *-ba* to indicate more than one girl. In LSL, conversely, a reduplicated sign is used to demonstrate plurality—the sign GIRL is reduplicated in example (5c) to denote a plural form.

(5) a. *English*
Girl > Girls

b. *Sesotho*
Ngoanana > **Ba**nana
(girl) *(girls)*

c. *LSL*
GIRL > GIRL++ (reduplicated sign)

Another standard English inflectional morphological process involves the addition of the suffix *-ed* to the main verb, resulting in a change of tense to the past tense, as exemplified in sentence (6a). Sesotho employs a similar morphological process as shown in (6b). In Sesotho, the morpheme *-ile* is used to replace the vowel in the final position of the main verb to change the tense to past tense. LSL does not use morphologically marked tenses; instead, it employs adverb modifications,

e.g. WEEK LAST, YESTERDAY, TWO DAY LAST, HOUR LAST, etc., to indicate when an action has occurred (see example 6c). LSL also uses the aspect marker FINISH to show the completive aspect, as illustrated in example (6c).

(6) *a.* *English*

Kick > Kick**ed**

b. *Sesotho*

Rah**a** > Rah**ile**

(kick) (kicked)

c. *LSL*

YESTERDAY BALL I KICK

(*I kicked the ball yesterday)*

or

BALL I KICK FINISH

(*I kicked the ball)*

Different derivational morphology processes between English, Sesotho, and LSL can also be observed. For example, in English, negation morphemes come before the word that they are negating, as illustrated in example (7a). Similarly, in Sesotho, the negation morpheme *se* precedes the word it is negating (see example 7b). In LSL, conversely, negation/negative morphemes come after the sign they are negating, as exemplified in example (7c).

(7) a. *English*

Dis + agree = Disagree

b. *Sesotho*

Se + lumele = se lumele

(negative morpheme) (agree) (disagree)

c. *LSL*

AGREE + NOT = Disagree

As demonstrated in section 2.5.3, sign languages exhibit a substantial presence of compound morphology. LSL adheres to this general pattern, as it exhibits a significant degree of compounding. However, the occurrence of this morphological process is relatively infrequent in both English and Sesotho. Apart from that, these three languages differ concerning compound headedness. English is a mostly a right-headed language, as seen in example (8a), where the word "table-cloth" is formed by combining the two words "table" and "cloth", with "cloth" being the head of the compound. Sesotho, on the other hand, is a left-headed language, as seen in example (8b), where the word “moletsa-phala” (referee) is formed by combining the two words “moletsa” (blower) and “phala” (whistle), with "moletsa" being the head of the compound. In contrast, headedness in LSL is not fixed. As seen in example (8c), the language allows for both right-headedness (DRIVE + PERSON = Driver) and left-headedness (PERSON + NOT-KNOW = Stranger), depending on the context of the sentence.

(8) a. *English*

Table-cloth

b. *Sesotho*

Moletsa-phala = Referee

(blower-whistle)

c. *LSL*

DRIVE^PERSON = Driver

or

PERSON^NOT-KNOW = Stranger

(Note:(^) joins the two parts of a compound)

In LSL, classifiers are used, and these possess contextual meanings. In contrast, English and Sesotho do not have classifiers. As indicated in 2.5.4, it may be anticipated that Deaf learners involved in this study may face difficulties in certain aspects of English MA. On the other hand, these learners may also have an advantage as they are aware that signs exhibit morphological complexity. Thus, this might make them more alert to morphological complexity in written English.

2.7 Chapter summary

I have reviewed the three relations of MA in both Deaf and hearing learners, drawing on the existing body of research on this topic. In this study, I investigate the extent to which the MA of Deaf and hearing learners in Lesotho aligns with existing knowledge on these relations. In this chapter, evidence was presented from previous studies that MA has a significant role in English reading comprehension for both Deaf and hearing learners. This study examines this association among Deaf and hearing learners in Lesotho. Morphological aspects of English, Sesotho, and LSL have also been described in this chapter. The current study examines the potential impact of the morphological systems in LSL and Sesotho (respectively) on the English MA of Deaf and hearing learners from Lesotho. In Chapter 5 (5.4), I analyse the errors made by these learners to determine the strength of the effects of their home language on their English MA.

Chapter 3: Methods

3.1 Overview

This chapter provides information on the research site (3.2) and the participants (3.3), as well as the procedure used for collecting data (3.4). The chapter also details the tasks administered in the study and why the particular tasks were chosen (3.5). It outlines how the collected data was analysed to address the study's research questions (3.6). Section 3.7 concludes the chapter with a concise summary of the details discussed.

3.2 Research Site

The participants are drawn from two government-funded Roman Catholic primary schools in Lesotho: a Deaf school and a hearing school. In the Deaf school, learners are taught by hearing teachers using a combination of LSL, signing in exact English, fingerspelling and lipreading. Learners in this school are required to read and write in English. Participants from this school are all Deaf, and their first language is LSL. Participants from the hearing school are all hearing learners. The language of teaching and learning in this school is English. The learners here are Sesotho first language speakers. Both schools are situated in a rural area in Berea district, about 30km from Maseru, the capital city of Lesotho. The Deaf school is a boarding school, and learners in this school come from a large area as there are few Deaf schools in the country. On the other hand, the hearing school is a day school, so the learners are local. Learners who attend both schools are from low socioeconomic backgrounds. Table 2 below presents a comparative summary of the distinguishing factors between the Deaf school and the hearing school.

Table 2: A comparison of the Deaf school and the hearing school

	Deaf School	Hearing School
L1 of learners	LSL	Sesotho
Language of Learning and Teaching	English	English
Mode of instruction	A combination of LSL, signing in exact English, fingerspelling and lipreading	Oral instruction
School area	Rural area in Berea District	Rural area in Berea District
Learners' socioeconomic background	Low	Low
Type of School	Boarding School	Day School
Funding	Government	Government

Ethical approval for the study was obtained from the Rhodes University Ethical Standards Committee (Ethics Number - 5702). Gatekeeper permission was received from the schools and the Lesotho Ministry of Education. To obtain consent from parents, consent forms were given to parents to sign if they wanted their children to participate in the study (See Appendix A1). Deaf learners who returned the signed consent forms were then asked for their assent by an LSL interpreter. The interpreter also conveyed questions from a biographical questionnaire using LSL and filled in the learner's responses (see Appendix A2). Hearing participants who had provided signed consent forms were asked for their spoken assent. Questions from the same biographical questionnaire used at the Deaf School were then presented to them orally.

3.3 Participants

There were 108 participants included in this study, drawn from a sample of learners in grades 3 to 7 in one Deaf school and one hearing school in Berea district. Table 3 presents the number of learners in the Deaf and hearing schools. The learners' sex and their mean self-reported age are also included in the table.

Table 3: Number of learners in each school, sex, and mean self-reported age

School	**Deaf School (N = 26)**		**Hearing School (N = 82)**	
Sex	Female	Male	Female	Male
N	10	16	47	35
Average Age (SR)	13.9	14.4	10.9	10.8

Note: N = number of participants; SR = self-reported

The total number of participants from the Deaf school was 26. There were 10 girls and 16 boys. The total number of participants from the hearing school was 82. There were 47 girls and 35 boys. The gap between the number of participants in these two schools results from a Lesotho education policy that places restrictions on Deaf schools to only allow a maximum of 10 learners per grade. The average self-reported age of participants in the Deaf school was 14.2 years old, and 10.8 years old in the hearing school. A student's independent samples t-test showed that the age mean difference of 3.36 between the Deaf school and the hearing school was significant, $t(106) = 7.6$, $p < 0.01$, 95% CI = [2.49; 4.20], $d = 1.71$. This difference is expected, given that Deaf learners generally start school later than the average hearing learner (Ngobeni et al., 2020).

3.4 Procedure for administering tasks

The tasks were administered similarly in both schools, except for the mode of explanation of the instructions for the tasks. At the Deaf School, instructions were signed to the learners by an LSL interpreter to make sure they understood what they were supposed to do, whereas at the hearing school, the instructions were explained orally to the learners. They did, however, both answer the tasks in written form. The learners from both schools were called to complete tasks in a room separate from the class and not used for teaching, one learner at a time.

Each learner completed two literacy assessment tasks, including a reading comprehension task (see 3.5.2) and an MA task, which consisted of five subtasks:

- The wugs task (see 3.5.1.1)

- A test of inflectional morphology on pseudo-verbs (see 3.5.1.2)
- A morpheme identification task (see 3.5.1.3)
- A word and sentence analogy task (see 3.5.1.4)
- A compound awareness task (see 3.5.1.5)

Learners only completed the tasks once. For each of the MA subtasks, two practice examples were given, which the interpreter (for the Deaf school) and researcher (for the hearing school) went through with the learner before they did the actual subtask items.

3.5 Measures

3.5.1 MA subtasks

The first four MA subtasks completed by the learners assessed their awareness of inflectional and derivational morphology. A total of 15 questions focused on their ability to adequately manipulate inflectional morphology, while 15 questions required them to use their knowledge of derivational morphology to give their answers. The final task, the compound awareness task, used 10 questions to measure the learners' ability to compound English words.

3.5.1.1 The wugs task

The wugs task (Berko, 1958) assessed learners' inflectional morphology. In this task, a learner was shown an image of an imaginary creature (see Figure 1 for an example) with the sentence "This is a wug" written below it. Afterwards, a second image with two imaginary creatures was presented to the learner, and they were then asked what the two creatures were called (the correct answer was wugs). Another imaginary creature was presented to the learner and was identified as "a cra"; just as with the "wug" stimulus, a second image was shown where there are two creatures. When learners were asked to name them, the expected answer was "cras". There were four more examples like this (see Appendix B1).

The results from this task demonstrated learners' awareness of the different morphemes used for making nouns plural in English. The participants in this study had to submit their answers in

written form, as opposed to the original study by Berko (1958), which required children to respond orally. This modification was made to accommodate the inclusion of Deaf learners in this research.

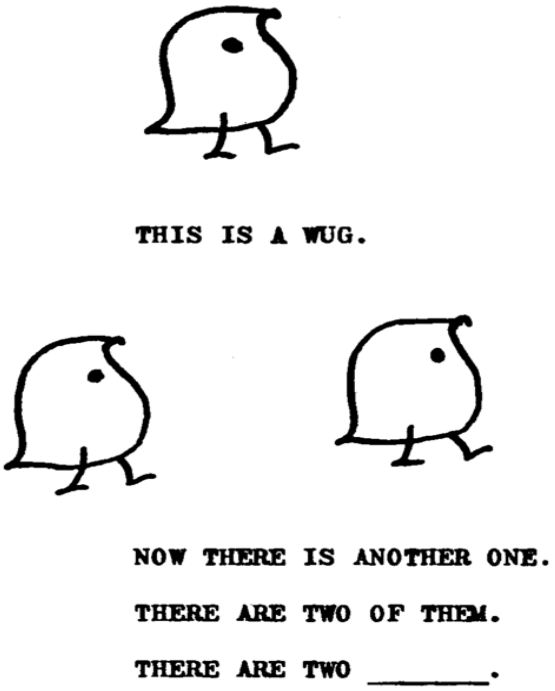

Figure 1: Wugs task example

Research shows that L2 English hearing learners can manipulate inflectional morphology adequately by their early primary school years (Kuo & Anderson, 2006). This type of task generally leads to ceiling effects amongst learners in later primary school years; that is, most learners should achieve close to or the highest score for the task. However, most of the research that has found these results was conducted in first-world countries (Carlisle, 2003; Clark, 1993). The context is different in Lesotho; as indicated in the introduction chapter (Section 1.3), the learners' literacy performance is low.

3.5.1.2 A test of inflectional morphology on pseudo-verbs

In the test of inflectional morphology on pseudo-verbs, learners were asked to complete patterns such as "the bird is **flamping**. Yesterday it ____". Here, the learner had to change the pseudo-verb into the past tense "**flamped**". These patterns were accompanied by images portraying actions. For

example, in the previously mentioned pattern, there was also an image of a bird flying (see Figure 2). There were four more patterns similar to this one (see Appendix B1).

The bird is **flamping**. Yesterday it _____.

Figure 2: A test of inflectional morphology on pseudo-verbs example

In these patterns, the learners were, in some cases, required to add the suffix *-ed* to some words to change the words' tense to past tense. As explained in Section 2.6, LSL does not have morphologically marked tense; instead, a time adverb is used to show when an action has taken place. For instance, a signer would have to sign YESTERDAY, WEEK LAST or TWO HOUR LAST at the beginning of their sentence to show when they did a particular action instead of adding *-ed* (as one would in English) to the verb. As also demonstrated in 2.6, Sesotho employs a similar system to English for expressing verb tense changes by adding *-ile* to indicate the past tense. It is for this reason that this task was chosen to assess how the Deaf participants perform compared to hearing participants on this task, given the difference in the morphological systems of their first languages.

3.5.1.3 A morpheme identification task

The morpheme identification task assessed the learners' capacity to decompose morphologically complex words into smaller, meaningful parts and to assess their receptive knowledge of derivational morphemes (Mcbride-chang et al., 2005). The word *disrespectful*, for example, is made up of the stem *respect* and the derivational morpheme *dis-* and *-ful,* and in the task, the

learners had to distinguish the morphemes with a slash, for example, *dis/respect/ful*. This task included ten derived words (see Appendix B2).

This study used this test to assess learners' ability to identify the different morphemes used in English. The morphological process employed in constructing words in this task differs from that used in LSL and Sesotho. For example, in LSL, morphemes *un-, im-, -in, and dis-* are usually indicated by the sign NOT. Therefore, to sign the words *unhappy*, *impolite*, *incomplete*, and *disrespect*, one would sign NOT followed by the free morpheme *happy, polite, complete,* or *respect*. Similarly, in Sesotho, the phrase *ho hloka,* corresponding to the concept of "not having", precedes the Sesotho terms for HAPPY*,* POLITE*,* COMPLETE*,* or RESPECT to form the words *unhappy, impolite, incomplete,* or *disrespect.*

3.5.1.4 A word and sentence analogy task

The sentence analogy task (based on Nunes et al., 2006) examined inflectional morphology using five questions. In the Nunes et al. (2006) study, participants were required to change the verb tense using tense morphemes in the sentence analogy task. This subtask was adapted for this study because tense morphology was assessed in the second morphological assessment task (see 3.4.1.2). In this sentence analogy task, learners were given questions which required them to change irregular verbs into past tense (see Appendix B3), for example, "The teacher **talks** to them, the teacher **talked** to them. The teacher **writes** to them, the teacher _____to them". This subtask was chosen to assess the learners' MA of irregular verbs.

The word analogy task also consisted of five questions (see Appendix B3) that tested the learners' understanding of derivation, such as how to form a noun by deriving it from its base verb; for example, learners were asked, "If I **sing**, I am a ____". Here, a learner was expected to add -er to the word *sing* to form the noun *singer*. A comparable process exists in LSL, as indicated in Section 2.5.3 of the literature review chapter, where a sign used for PERSON is added to a verb to form a noun. I hypothesised that Deaf learners would outperform hearing learners on this specific subtask. In section 5.2, I discuss the learners' performance on this task.

3.5.1.5 A compound awareness task

The learners were asked to complete a compound awareness task. Learners had to choose a word that matched the meaning of a question or scenario they were given. For example, the learners were asked, “What do you call a **tree** that grows **apples**? A tree apple or an apple tree?" The expected answer was “an apple tree”. This subtask consisted of nine similar questions (see Appendix B4). Compounding is prominent in sign languages, including LSL, as indicated in Section 2.5.3; thus, I hypothesised that Deaf learners in this study would exhibit a high level of competency in English compound awareness compared to hearing learners.

3.5.2 Reading comprehension

Learners’ reading comprehension was assessed using a written comprehension task. The learners were presented with a short story to read and then given ten questions that assessed their understanding of the content (see Appendix B5). Their performance was scored out of 10, as each question was worth one mark. This task was not timed; the learners were permitted to read over the passage several times and refer back to it when answering questions. They were also allowed to alter their answers.

The learners were asked a combination of literal and inferential questions. Literal questions are straightforward questions that relate to information explicitly detailed within the text; for example, one of the questions learners were asked after reading a passage presented to them was “Where does Lerato’s grandfather live?” and the expected answer was **“**Lerato’s grandfather lives in Roma”. The passage begins with the statement, “Lerato loves her grandfather. He lives in Roma…” (see Appendix B5). Literal questions were used in this task because comprehension is traditionally assessed by drawing on literal-based answers in primary schools, so the learners were expected to be familiar with these types of questions.

As aforementioned, learners were also asked inferential questions. These questions relate to information not directly given within the text; for example, the learners were asked, “How many children are there in Lerato’s family?” and the expected answer was “There are two children in Lerato’s family”. In the third paragraph of the story, Lerato’s sister is mentioned (see Appendix B5). The learners were expected to find their answer from this statement. They had to use their

understanding of the text in order to answer these types of questions. Answers to these questions help assess the learners' reading comprehension level.

3.6 Data Analysis

In the proceeding chapter, the results from the tasks administered in this study are explored to answer the study's three research questions. Data is analysed through appropriate statistical analyses using Jamovi (https://www.jamovi.org/). For example, descriptive statistics are used to answer Research question 1 to establish students' performance on the MA tasks. To answer research question 2, a correlation matrix and regression analyses are used to establish the relationship between the learners' MA and English reading comprehension. For research question 3, an error analysis is done on the learners' data to determine the types of errors Deaf and hearing learners made on the MA subtasks. Errors are classified according to these categories, as detailed in Table 4 on the next page.

3.7 Chapter summary

In this chapter, information on the participants and the research site is provided to establish the context for this research. Different tasks chosen for the study are also presented, detailing how the tasks (and subtasks) were carried out and why the particular tasks were chosen. Some subtasks were developed from tests from similar previous studies in other countries, as a study of this nature, comparing Deaf and hearing learners in Lesotho, has not been done. This chapter also details how the learners' task performance is analysed in the following results chapter.

Table 4: Error taxonomy

Task	Category of error	Explanation	Example
Wug task	Completely incorrect	Random words given	ios, ras, ar, garen, gathelet, kanitfb, gathone, gntbnoe, chi, ra, or, themond, themian, themii, kerax, totaso, thota, oneo, tofemo, fotafh
	Incorrect lexical item used	Used a different lexical item to that being assessed	Wrote wugs instead of cras
	Repeat of stimulus	Wrote out the stimulus instead of a response	1.There are two of them 2. Cra-Cra; Gutch-Gutch; Tor-Tor; Niz-Niz; Kazh-Kazh
	Incorrect addition of morpheme	Wrote –s instead of –es	Kazh-Kazhs instead of Kazh-Kazhes
A test of inflectional morphology on pseudo-verbs	Completely incorrect	Random words given	Linen, lina, tle, ciina, fram, tufud, reste, jlin, mobile, knbilib, lina, flet
	Incorrect tense	Wrote incorrect tense	Yesterday it flamp; yesterday she knop
	Repeat of Stimulus	Wrote out the stimulus instead of a response	Flamping-flamping; glinging-glinging
	Correct tense applied inappropriately	Adding -ing and -ed incorrectly	Yesterday the man tufed. Today he is tufeding; The bird is flamping. Yesterday it flampinged; The lady is knoping the flower. Yesterday she knopied the flower; The bird is flamping. Yesterday it flampied.
	Additional vowel in word final position	Adding vowel /i/ or /e/ at the end of the word (transfer from Sesotho)	Flampi instead of flamp; mote instead of mott; motti instead of mott
	Arbitrary marking on word	Randomly marked words	Disres/pectful; Rew/rite
Morpheme identification	Words broken down into morphemes inadequately	Did not identify all morphemes	Unkind/ness or un/kindness instead of un/kind/ness
	Lexical isolation	Isolated lexical items within words	Uncomfor/table; misbe/have; ill/egal
	Completely incorrect	Random words given	Irat, wra, set, sit, fate, fanne, tiki, kine, rada, woka, sela, beka, doka, sii, tien

Sentence analogy	Simplification	Put into present progressive instead of past tense	Write-writing instead of wrote; begin-beginning instead of began
	Overgeneralization	Adding past tense morpheme -ed or plural morpheme -s where it does not apply	Run- runned, write – writesed, drink- drinked; s to all words
	Incorrect spelling	Spelled words incorrectly	Sow instead of saw; soo instead of saw; run instead of ran
	Repeat of example	Copied example given	Walked instead of ran (from "I walked, she walked"); barked instead of drank (from - the dog barks at Thabo, the dog barked at Thabo)
	Repeat of Stimulus	Rewrote stimulus given	Writes-writes; writes-write; sees-see
	Incorrect representation of morpheme	added -r instead of -er	Sing-singr; Writes-writesr; farm-farmr; bakes-bakesr; drives-drivesr
	Repeat of Stimulus	Rewrote stimulus given	Sing-sing; farm-farm
Word analogy	Applied inflectional morpheme	Added plural morpheme to words	If I sing, I am a sings; Thato works on a farm. He is a farms. My mother bakes cakes. She is a bakes; She writes. She is a writeses.
	Completely incorrect	Random words given	Farpo; siga; ama; heisa
	Repeat of example	Copied example given	Thato works on a farm. He is a teacher. Taken from the example, if I teach, I am a teacher.
	Incomplete grasp of the rule	Added -er incorrectly	Bakes-bakeser; drives-driveser; writes-writeser
	Additional vowel in word final position	Adding vowel /e/ at the end of the word (transfer from Sesotho)	Sing-singe; farm-farme; farm-farma; farm-farmo; writes-writese; bakes-bakese; bakes-bakesi; drives-drivese; drives-drivesa

Chapter 4: Results

4.1 Overview

In this chapter, the results of the MA and reading comprehension tasks are reported per school in 4.2.1. Due to the wide age range of participants from grade 3 to grade 7, the data is also presented according to two grade groups: lower grades (grades 3 to 5) and higher grades (grades 6 to 7) in each school, in 4.2.2. Section 4.3 examines how the results of the tasks show the contribution of inflectional awareness, derivational awareness, and compound awareness to reading comprehension in each school. In addition, the different types of errors made by the learners on these tasks are presented in 4.4. The chapter concludes by highlighting the key results in 4.5.

4.2 Research question 1: Overview of learner performance by school

Table 5 presents the descriptive statistics for the learners' performance on the MA individual subtasks: the wugs task, the test of inflectional morphology on pseudo-verbs, the sentence analogy, the morpheme identification task, the word analogy task and compound awareness task, for each school. The means, Standard Deviations (SD), and minimum and maximum scores are reported for each subtask per school. Due to the non-normal distribution of the data, a Mann-Whitney U samples test was used to determine whether the mean difference in the two schools' performance was significant. The *p*-value is included in Table 5.

Learners from the hearing school performed better than those from the Deaf school on the wugs task. The learners from both schools performed better on this task than the other two inflectional awareness tasks. The wugs task score for the hearing school was 31%, and for the Deaf school was 23.8%. The Deaf school performed better on the test of inflectional morphology on pseudo-verbs than the hearing school. The mean score for the Deaf school on this task was 20% and 8.54% for the hearing school. The mean sentence analogy task score for the Deaf school was 1.54%, and 4.64% for the hearing school. These scores are lower than those for the wugs task and the test of inflectional morphology on pseudo-verbs.

Table 5: Means, standard deviations, minimum and maximum scores, and *p*-value (Mann-Whitney U) for performance on MA subtasks by school

	Deaf School (N=26)				**Hearing School (N=82)**				
	M	SD	Min	Max	M	SD	Min	Max	p
Wugs task (/5)	1.19	1.02	0	3	1.55	1.04	0	5	0.18
Test of inflectional morphology on pseudo-verbs (/5)	1.00	1.85	0	5	0.43	0.89	0	4	0.49
Sentence Analogy task (/5)	0.08	0.27	0	1	0.23	0.67	0	4	0.42
Morpheme Identification (/10)	2.37	1.75	0	7	3.10	2.56	0	9.5	0.34
Word Analogy task (/5)	1.54	2	0	5	0.88	1.64	0	5	0.09
Compound Awareness (/10)	5.3	2.53	0	10	6.46	2.16	0	10	0.04

Learners from the hearing school performed better than those from the Deaf school on the morpheme identification task. The learners from both schools performed better on this task than the other derivational awareness task (word analogy). The morpheme identification mean score for the hearing school was 31%, and 23.7% for the Deaf school. The hearing school performed better on the word analogy task than the Deaf school. The mean score for the hearing school was 40%, and 30.8% for the Deaf school. The mean compound awareness score for the Deaf school was 53.1%, and 64.6% for the hearing school.

The scores for these subtasks have been combined into a score of inflectional awareness (inclusive of scores on the wugs task, the test of inflectional morphology on pseudo-verbs and the sentence analogy task) and a score of derivational awareness (inclusive of the morpheme identification task and the word analogy task scores) in the subsequent sections as the focus of this study is on learners performance in relation to inflectional, derivation and compound awareness. The reliability of the inflectional awareness tasks ($\alpha = 0.61$) and derivational awareness tasks ($\alpha = 0.66$) is moderately acceptable as measured by the Cronbach's alpha reliability test. Reliability indices are not available for the compound awareness and reading comprehension tasks due to how the data was captured at the time of testing.

4.2.1 Learner performance on MA and reading comprehension tasks

Table 6 presents the descriptive statistics for the learners' performance on the MA subtasks and the reading comprehension task by school. The means, SD, and minimum and maximum scores for each task by school are shown in this table.

Learners from the Deaf school performed slightly better than those from the hearing school on the inflectional awareness tasks, although both scores were very poor. The mean inflectional awareness score for the Deaf school was 15.1% (M = 2.27; SD = 2.66), and for the hearing school was 14.7% (M = 2.21; SD = 2.08). In both schools, the minimum score achieved was 0 out of 15. The maximum score in the Deaf school was 8 out of 15, and 13 out of 15 in the hearing school. The Mann-Whitney U samples test showed that the mean difference of 0.06 between the Deaf school and the hearing school on these tasks was not significant, $U = 962$, $p = 0.44$, 95% Confidence Interval = [-1.00; 0.00006], $d = 0.098$.

Table 6: Means, standard deviations, minimum and maximum scores for MA and comprehension task by school

	Deaf School (N=26)					**Hearing School (N=82)**				
	M	SD	Min	Max	α	M	SD	Min	Max	α
Inflectional Awareness (/15)	2.27	2.66	0	8	0.61	2.21	2.08	0	13	0.61
Derivational Awareness (/15)	3.9	3.47	0	12	0.66	3.98	3.71	0	14.5	0.66
Compound Awareness (/10)	5.31	2.53	0	10	N/A	6.46	2.16	0	10	N/A
MA Total (/40)	11.5	7.52	0	25.5	N/A	12.6	6.18	2.5	37.5	N/A
Comprehension (/10)	2	3.31	0	9	N/A	1.26	2.66	0	10	N/A

Note: Inflectional awareness tasks included the wugs task, the test of inflectional morphology on pseudo-verbs and the sentence analogy task. Derivational awareness tasks included the morpheme identification task and the word analogy task.

The hearing school performed the same on the derivational awareness tasks as the Deaf school. The mean derivational awareness score for the Deaf school was 26% (M = 3.9; SD = 3.47) and 26.5% for the hearing school (M = 3.98; SD = 3.71). The minimum task score was 0 out of 15 for both schools. The maximum score for the hearing school was 14.5 out of 15, and for the Deaf school was 12 out of 15. The difference in the schools' mean scores was not statistically significant, $U = 1043$, $p = 0.87$, 95% Confidence Interval = [-1.00; 1.50], $d = 0.02$.

As already reported, the mean compound awareness score for the Deaf school was 53.1% (M = 5.31; SD = 2.53) and for the hearing school was 64.6% (M = 6.46; SD = 2.16). These scores are markedly much higher than those for inflectional and derivational awareness tasks. Both schools had a minimum score of 0 out of 10 and a maximum score of 10 out of 10 on this task. The hearing school scored better than the Deaf school on the task. A Mann-Whitney U samples t-test showed that the mean difference of 1.15 was significant, $U = 779$, $p = 0.04$, 95% Confidence Interval = [-2.00; -0.00008], $d = 0.27$.

Overall, the hearing school performed slightly better than the Deaf school on the combined total MA score, although both scores were low. The mean MA total score for the hearing school was 31.5% (M = 12.6; SD = 6.81), and for the Deaf school was 28.75% (M = 11.5; SD = 7.52). The minimum score for the hearing school was 2.5 out of 40, and for the Deaf school was 0 out of 40. The maximum score, on the other hand, was 37.5 for the hearing school and 25.5 for the Deaf school. Although the learners' overall performance from the hearing school was better, the difference was not statistically significant, $U = 975$, $p = 0.52$, 95% Confidence Interval = [-4.51; 2.18], $d = 0.09$.

Both schools performed better on the compound awareness task than the other two MA tasks. Deaf school performed better on the derivational awareness task (Mdn = 2.50) than the inflectional awareness task (Mdn = 2.00). A Wilcoxon Test paired samples test showed that this difference is statistically significant, $W = 6.00$, $p < .001$. The hearing school also performed better on the derivational awareness task than the inflectional awareness task (Mdn = 2.50) than the inflectional awareness task (Mdn = 2.00). A Wilcoxon Test paired samples test showed that this difference is statistically significant, $W = 298$, $p < .001$.

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Finally, the Deaf learners performed better than the hearing learners in the reading comprehension task. The mean comprehension score for the Deaf school was 20% (M = 2; SD = 3.31), and for the hearing school was 12.6% (M = 1.26; SD = 2.66). Both schools had a minimum score of 0. The maximum score for the Deaf school was 9 out of 10, and for the hearing school, it was 10 out of 10. Even though there was a difference in the reading comprehension scores of the Deaf school and the hearing school, a Mann-Whitney U samples test showed that the mean difference of 0.74 between the schools was not significant, $U = 967$, $p = 0.37$, 95% Confidence Interval = [-0.00002; 0.00004], $d = 0.09$.

4.3 Research question 2: The Contribution of MA to Reading Comprehension

Table 7 presents the correlation between inflectional awareness, derivational awareness, compound awareness and the comprehension tasks in each school. A correlation matrix was run to determine the strength of the relationship between the variables of interest in this study.

Table 7: Pearson's Correlation Coefficients for inflectional awareness, derivational awareness, compound awareness and comprehension by School

	1	2	3	4
Inflectional Awareness (1)	—	0.71***	0.48*	0.70***
Derivational Awareness (2)	0.67***	—	0.53**	0.76***
Compound Awareness (3)	0.51***	0.55***	—	0.42***
Comprehension (4)	0.64***	0.81***	0.51***	—

*Note. * p < .05, ** p < .01, *** p < .001*
Hearing school below diagonal line (in green); Deaf school above diagonal line (in yellow)

All variables are positively and significantly correlated in both the Deaf and hearing schools. Data from the Deaf school shows a strong correlation between inflectional awareness and derivational awareness, $r(26) = 0.71$, $p<.001$. Inflectional awareness and comprehension are also significantly strongly correlated, $r(26) = 0.70$, $p<.001$. Inflectional awareness has a weak to moderate

correlation with compound awareness, $r(26) = 0.48$, $p<.001$. Derivational awareness is moderately and significantly correlated to compound awareness, $r(26) = 0.53$, $p<.001$. There is also a significant strong correlation between derivational awareness and comprehension, $r(26) = 0.76$, $p<.001$. Compound awareness and comprehension have a weak but significant correlation, $r(26) = 0.418$, $p < .001$.

Data from the hearing school indicates a significantly moderate correlation between inflectional awareness and derivational awareness, $r(82) = 0.67$, $p<.001$. There is also a significantly moderate correlation between inflectional awareness and compound awareness, $r(82) = 0.51$, $p<.001$. Inflectional awareness and comprehension are significantly moderately correlated as well, $r(82) = 0.64$, $p<.001$. Derivational awareness has a significantly moderate correlation with compound awareness, $r(82) = 0.55$, $p<.001$. There is a significantly strong correlation between derivational awareness and comprehension, $r(82) = 0.81$, $p<.001$. Compound awareness and comprehension have a significantly moderate relationship, $r(82) = 0.51$, $p <.001$.

In order to determine the unique contribution of MA to English reading comprehension, a linear regression on the two samples (Deaf and hearing school) was run.

A linear regression analysis for the results from the Deaf school showed that together inflectional awareness, derivational awareness and compound awareness had a significant effect on reading comprehension, $F(3, 104) = 59.5$, $p<.001$. Together, they explained 63% of the variance. However, only inflectional awareness ($t= 3.8$, $p<.001$) and derivational awareness ($t= 6.07$, $p<.001$) made unique contributions to reading comprehension. Derivational awareness ($\beta = 0.53$) made a larger contribution than inflectional awareness ($\beta= 0.32$).

Results of the linear regression for the hearing school showed that together inflectional awareness, derivational awareness and compound awareness had a significant effect on reading comprehension, $F(3, 78) = 52.5$, $p<.001$. Together, they explained 67% of the variance. Only inflectional awareness ($t= 1.75$, $p= 0.08$) and derivational awareness ($t= 7.16$, $p<.001$) made unique contributions to reading comprehension. Derivational awareness ($\beta = 0.66$) made a larger contribution than inflectional awareness ($\beta = 0.16$).

4.4 Research question 3: Types of errors made by Deaf and hearing learners on MA tasks

This section looks at errors made by learners from Deaf and hearing schools on the inflectional and derivational awareness tasks. The total number of errors made in each task by school is presented. The significance of the difference between the number of errors made by the Deaf and hearing learners is measured. Finally, pie charts are presented to show the distribution of errors made in each task per school.

4.4.1 Errors made on inflectional awareness tasks

Table 8 presents the raw scores for the number of errors made by the Deaf and hearing learners on the inflectional awareness tasks. The distributions of the categories of errors made by learners are represented graphically in Figures 3, 4 and 5. The total number of errors made in the inflectional awareness tasks in the Deaf school was 144, and 568 in the hearing school. A Chi-square test of independence was used to determine whether the difference between the number of errors made by the Deaf learners and hearing learners on inflectional awareness tasks was measurable or simply by chance. The test showed that the difference between the total errors made by the learners is not significant, X^2 (6, N = 108) = 8.17, p = 0.17.

The category with the highest number of errors for both the Deaf and the hearing school in the wugs task is the 'incorrect addition of morpheme', accounting for 59% of errors in the Deaf school and 61% in the hearing school. This is followed by the 'repeat of stimulus' category for both schools. This category accounts for 37% of errors in the Deaf school and 27% in the hearing school. The hearing school also has a score of 12% errors under the 'completely incorrect' category. The category with the highest number of errors on the test of inflectional morphology on pseudo-verbs is 'the repeat of stimulus' in both schools. This category represents 81% of errors in the Deaf school and 36% in the hearing school. This category is followed by 'incorrect tense' in the Deaf school (11%) and the hearing school (24%). In the sentence analogy task, the category with the highest number of errors in both the Deaf and the hearing school is the 'repeat of stimulus'. In this task, 50% of errors are attributed to the 'repeat of stimulus' category in the Deaf school, while in the hearing school, the percentage is 46%. The category with the second highest number of errors in this task is 'overgeneralisation' in the Deaf school (37%) and the hearing school (23%).

This category is followed by the ‘repeat of example’ in both schools, accounting for 13% of errors in the Deaf school and 6% in the hearing school. The hearing school also has a score of 6% errors under the ‘incorrect spelling’ category.

Table 8: Categories of errors and number of errors made in each category by school on inflectional awareness tasks

Tasks	Category of error	Number of errors in Deaf School	Number of errors in Hearing School
Wugs task	Completely incorrect	1	25
	Incorrect lexical item used	2	0
	Repeat of Stimulus	26	58
	Incorrect addition of morpheme	42	129
The test of inflectional morphology on pseudo-verbs	Completely Incorrect	1	13
	Incorrect tense	3	39
	Repeat of Stimulus	22	59
	Correct tense applied inappropriately	0	9
	Additional vowel in word final position	1	43
Sentence Analogy task	Overgeneralization	17	45
	Completely incorrect	0	12
	Simplification	0	10
	Incorrect spelling	0	4
	Repeat of example	6	12
	Repeat of Stimulus	23	88
Total Errors		144	568

Figures 3, 4 and 5 below show side-by-side pie charts that display distributions of the categories of errors made by learners in both schools on the inflectional awareness tasks.

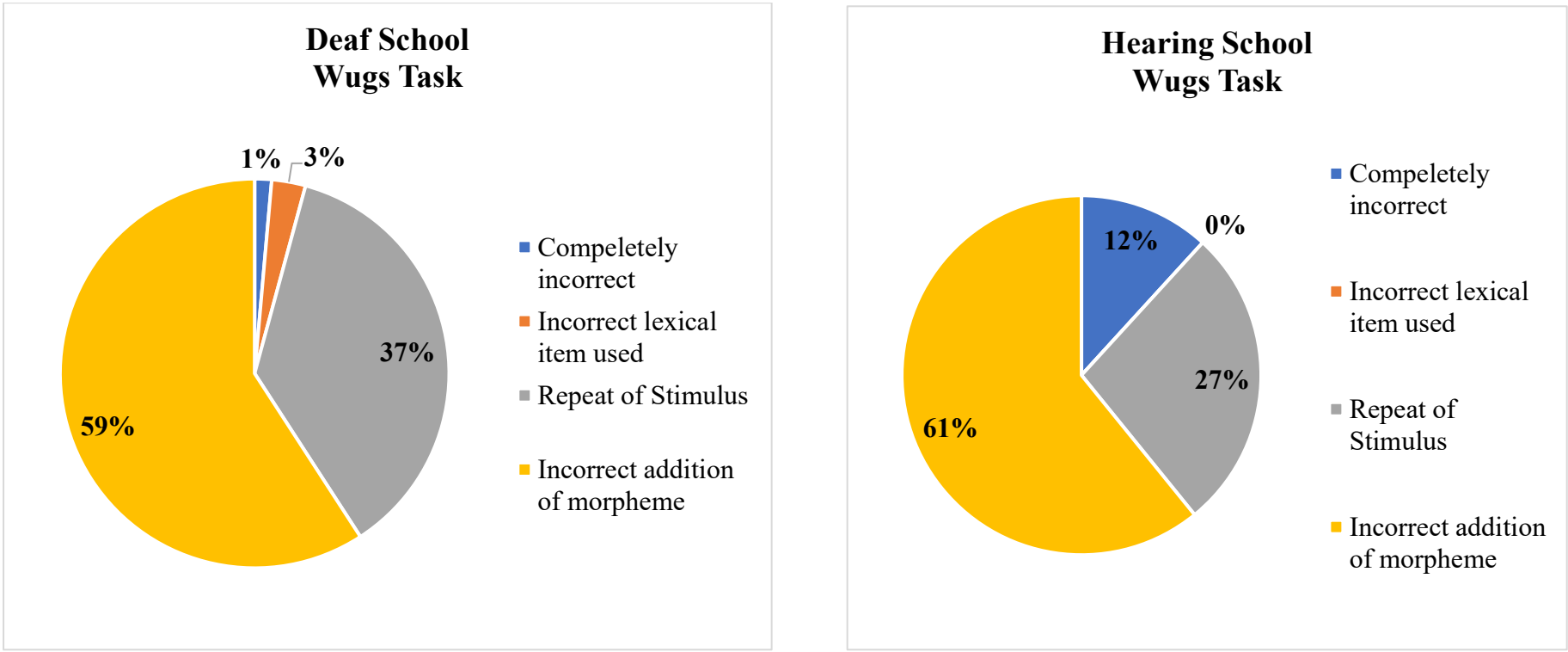


Figure 3: Pie charts showing the distribution of the types of errors made on the wugs task by school

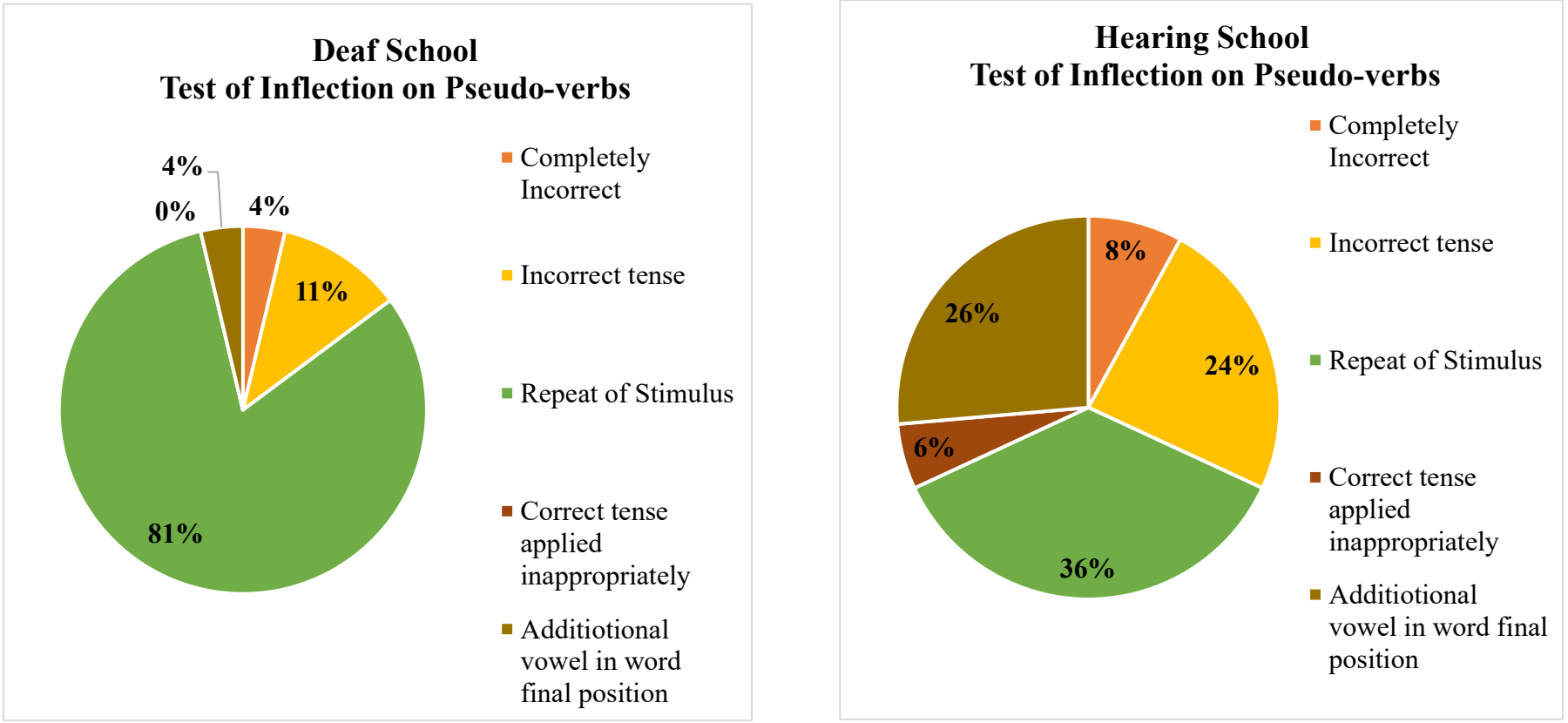
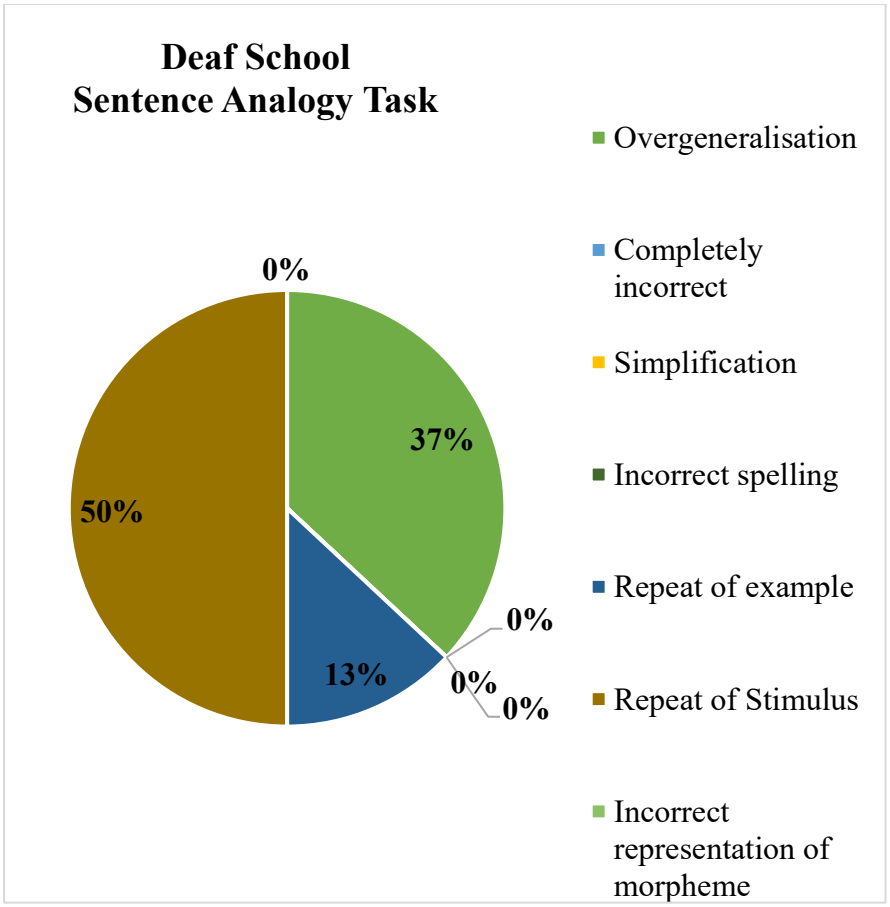


Figure 4: Pie charts showing the distribution of the types of errors made on the test of inflectional morphology on pseudo-verbs by school



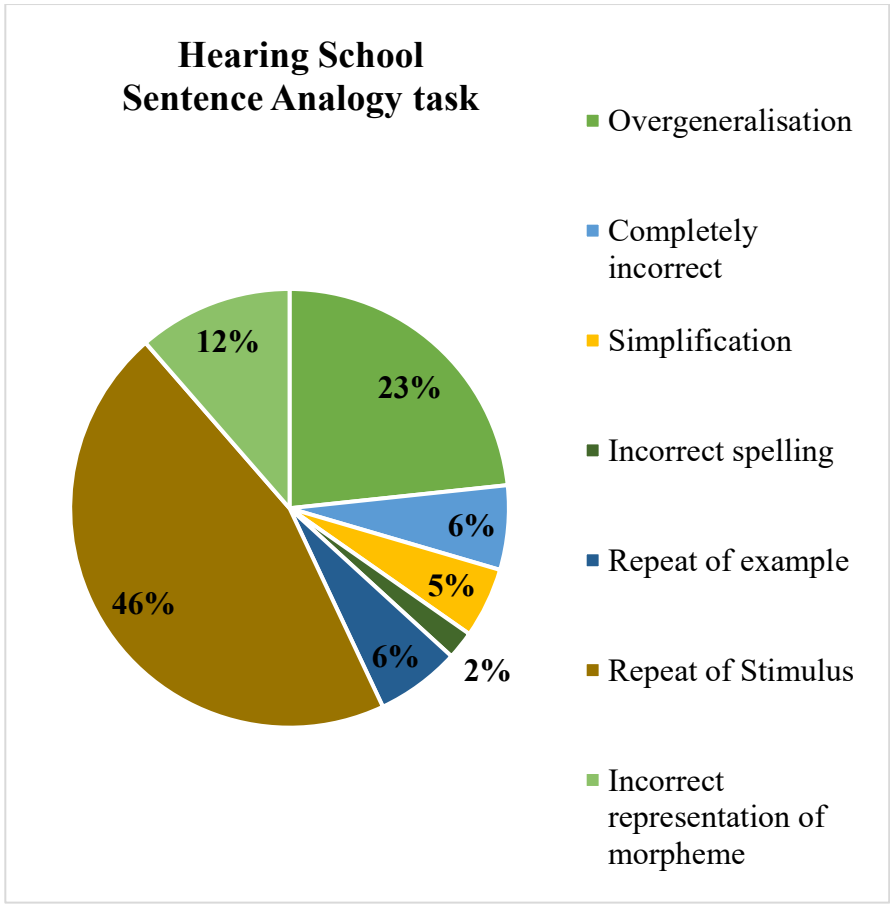


Figure 5: Pie charts showing the distribution of the types of errors made on the sentence analogy task by school

4.4.2 Errors made on derivational tasks task

Table 9 presents the raw scores for the errors made by the Deaf and hearing learners on the derivational awareness tasks. The distributions of the categories of errors made by learners are represented graphically in Figures 6 and 7. The total number of errors made in the derivational awareness tasks in the Deaf school was 193, and 665 in the hearing school. A chi-square test of independence showed that there was no significant difference between errors made by Deaf and hearing learners on derivational awareness tasks, X^2 (4, N = 108) = 0.42, p = 0.52.

In the morpheme identification task, the category with the highest number of errors in both the Deaf and the hearing school is 'arbitrary marking on the word'. In this task, 80% of errors are attributed to the 'arbitrary marking on word' category in the Deaf school, while in the hearing school, the percentage is 76%. This category is followed by 'lexical isolation' in the Deaf school (12%) and the hearing school (14%). The category with the lowest prevalence of errors is 'incomplete identification of morphemes' in both schools. In the Deaf school, the 'incomplete identification of morphemes' category accounts for 8% of errors made on this task and 10% in the hearing school. The predominant error category in the word analogy task is the 'repeat of stimulus'. It is equivalent across the Deaf and hearing school, with 46% of errors attributable to this category. This is followed by the 'applied inflectional morpheme' category (22%) in the hearing school and the 'incomplete grasp of morpheme' in the Deaf school (26%).

Table 9: Categories of errors and the number of errors made in each category by school on derivational awareness tasks

Tasks	**Category of error**	**Number of errors in Deaf School**	**Number of errors in Hearing School**
Morpheme Identification	Arbitrary marking on word	127	419
	Words broken down into morphemes inadequately	13	53
	Lexical isolation	18	76
Word Analogy task	Incorrect representation of morpheme	0	22
	Repeat of Stimulus	16	54
	Applied inflectional morpheme	0	26
	Completely incorrect	0	3
	Repeat of example	5	7
	Incomplete grasp of the rule	9	14
	Additional vowel in word final position	5	13
Total Errors		193	665

The following pie-charts (figures 6 and 7) display distributions of the categories of errors made by learners from both schools on the derivational awareness tasks.

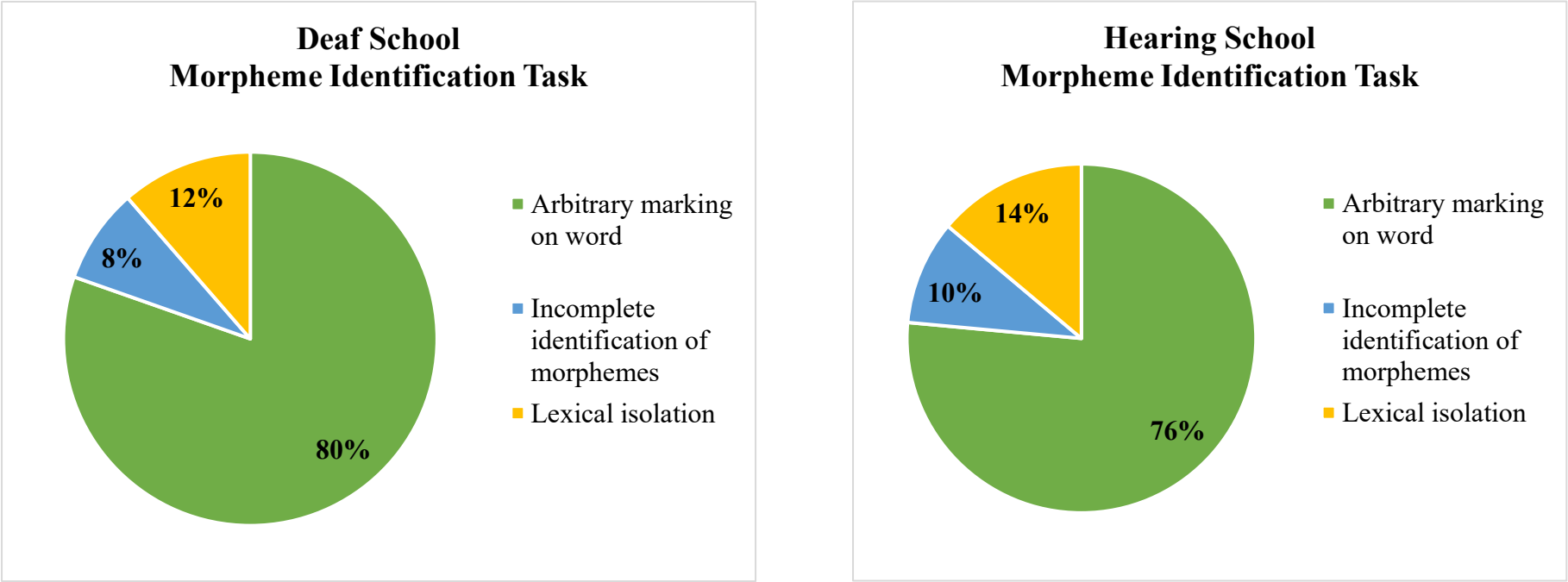


Figure 6: Pie charts showing the distribution of the types of errors made on the morpheme identification task by school

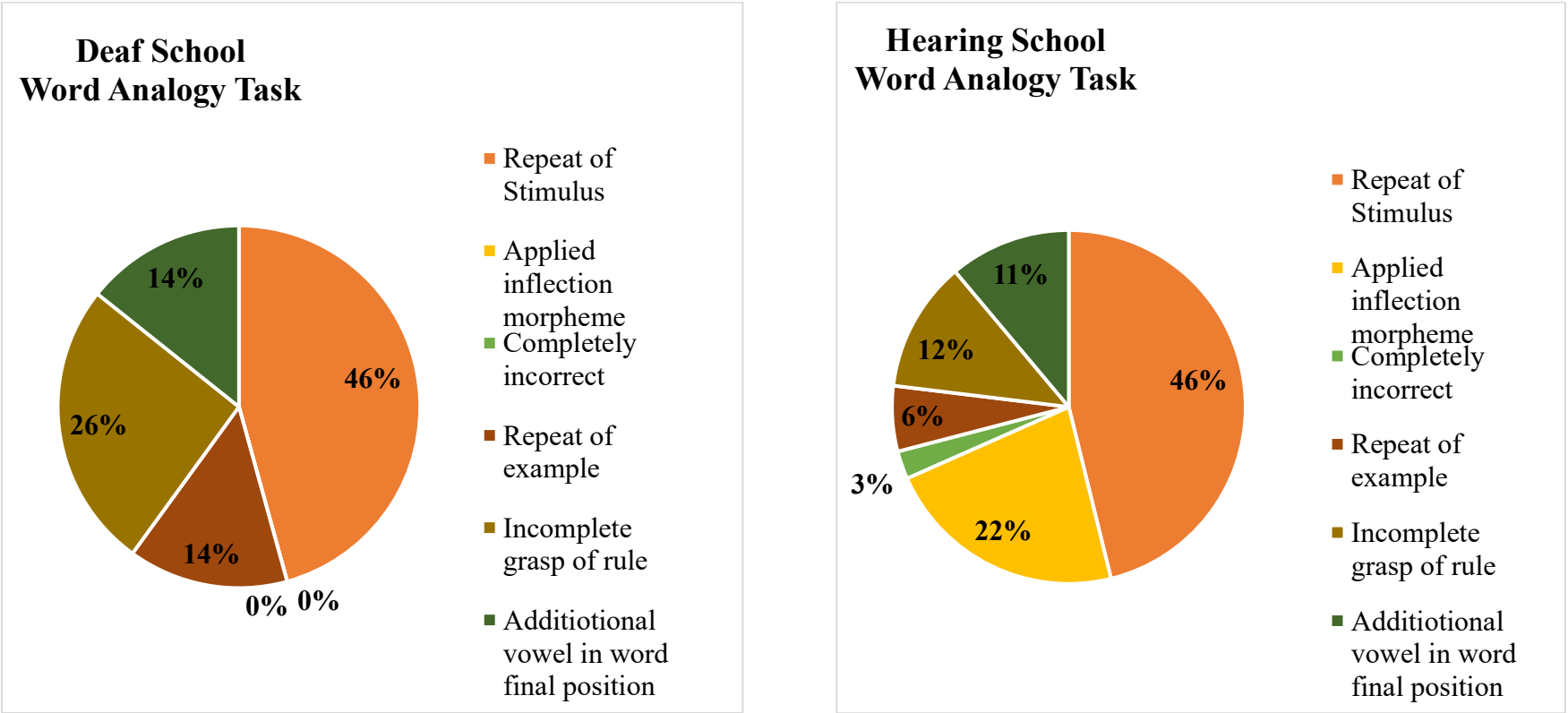


Figure 7: Pie charts showing the distribution of the types of errors made on the word analogy task by school

4.5. Chapter summary

The results show that learners' performance on the tasks was relatively poor. The hearing school performed better than the Deaf school on the derivational and compound awareness tasks. The difference was significant on the compound awareness task but not on the inflectional awareness, derivational awareness, or reading comprehension tasks. The hearing school performed slightly better than the Deaf school on the combined total MA score. In both schools, a linear regression analysis showed that together inflectional awareness, derivational awareness and compound awareness had a significant effect on reading comprehension. However, only inflectional awareness and derivational awareness made a unique contribution. Derivational awareness made a larger contribution than inflectional awareness for both the Deaf learners and hearing learners. Lastly, the results show that the error category with the highest number of errors in both schools was the 'incorrect addition of morpheme' category on the wugs task and the 'repeat of stimulus' category on all tasks. Less prominent categories were unique to either the Deaf or hearing group, with some errors found in the Deaf school but not in the hearing school and vice versa. The next chapter interprets these findings.

Chapter 5: Discussion

5.1 Overview

The purpose of this study is threefold. Firstly, it examines Deaf and hearing Grade 3 to 7 learners in Lesotho in terms of their English MA, specifically in relation to inflectional morphology, derivational morphology, and compound morphology. Secondly, it assesses the effect of written MA on these learners' English reading comprehension abilities. Moreover, it compares the errors made by Deaf learners and hearing learners on MA tasks. In this chapter, I interpret the results of the tasks completed by both Deaf and hearing learners to address the research questions posed in this study (5.2, 5.2.1, 5.2.2, 5.3, and 5.4). Section 5.5 provides a summary of the main points discussed in the chapter.

5.2 Learner performance on inflectional morphology tasks

This study's results show that Deaf and hearing learners, including those in higher grades, obtained low scores on tasks related to inflectional awareness. This is particularly concerning given that literature suggests that learners learn inflectional awareness early in primary school (Carlisle, 2003; Clark, 1993; Zhang & Koda, 2013). This study's inflectional awareness tasks included the wugs task and a test on pseudo-verbs, as indicated in Section 4.1. In the original Berko (1958) wugs experiment from which this study draws these two tasks, Berko (1958) found that native English-speaking hearing learners between 3 and 7 years old generally performed well in inflecting pseudo-verbs and pseudo-nouns. However, they did struggle with semi-regular pseudo-nouns (e.g. *niz-nizzes)* and semi-regular pseudo-verbs (e.g. *mot-motted)*. Instead of the regular pattern of simply adding *-s* to pluralise nouns, semi-regular nouns require repeating the consonant in the final letter position and then adding *-es* for pluralisation. Similarly, instead of adding *-ed* verbs to change their tense, semi-regular verbs require repeating the consonant in the final letter position and then adding *-ed* to change verb tense.

This study found results comparable to Berko's (1958) on the difficulties encountered with semi-regular verbs and nouns. For instance, learners would incorrectly add *-s* to semi-regular pseudo-nouns instead of repeating the consonant in the final letter position and then adding *-es*. Learners at all grade levels, including those in higher grades, encountered these challenges. However, in

contrast to the participants in Berko's (1958) study, who generally performed well, the learners in this study scored low on tasks that involved the inflection of pseudo-words. It is worth noting that Berko's (1958) study was conducted with native English-speaking American learners from an urban area and in a very different context from this current study. The low performance of the learners in this study was observed not only with semi-regular and irregular pseudo-nouns and verbs but also with regular pseudo-nouns and pseudo-verbs. I predicted that the hearing school would exhibit a ceiling effect in higher grades, particularly on the wugs task scores. However, that prediction proved to be incorrect. As indicated in 3.5.1.1, Berko's (1958) wugs task was done orally, and the wugs task in this study was written for both the Deaf and hearing learners. It remains uncertain if the hearing participants in this study would have performed differently if they were required to vocalise their answers instead of writing them. However, the results indicate that the errors made on these tasks are not solely dependent on phonetic influence and spelling, as discussed later in this chapter (5.4).

As stated in Chapter 2 (section 2.2.1), research indicates that Deaf learners lag behind hearing learners in their development of inflectional awareness. The studies show hearing learners have more advanced inflectional awareness than their Deaf counterparts (Breadmore, 2007; Gaustad et al., 2002; Gaustad & Kelly, 2004). The results from this study run counter to this literature, which suggests the existence of a discrepancy in the development of inflectional awareness between Deaf and hearing learners. In this study, the level of inflectional awareness of Deaf learners is practically the same as that of hearing learners.

Concerning individual task performance, hearing learners outperformed Deaf learners in the wugs task. Specifically, they had a better awareness of adding the morpheme *-s* and, in some instances, *-es* to pseudo-nouns. Breadmore et al. (2012) show that Deaf learners may have an advantage in the morphological process of pluralisation, particularly in terms of generalising (e.g., adding *-s* to a noun to make it plural). This benefit arises from their reduced interference from conflicting phonological cues. The authors assert that the relationship between sounds and orthography in semi-regular plurals can sometimes be unclear, such as the absence of the /*z*/ sound in the word *watches*. Additionally, some plurals are semi-regular in terms of their spelling but are regular in their pronunciation, for example, the word *families*. Consequently, hearing learners may be

disadvantaged in spelling semi-regular plurals because of oral influence. However, this did not hold for the participants in this study since the hearing learners outperformed the Deaf learners on semi-regular pseudo-noun plurals.

In the test of inflectional morphology on pseudo-verbs, Deaf learners outperformed hearing learners. The difference in their performances was statistically significant. As mentioned in Section 2.5.1, morphologically marked tenses are not used in LSL. This makes conveying tense in English, a foreign morphological process for Deaf learners. It is possible that educators consider this factor when instructing Deaf learners on irregular verbs, providing them with explicit instruction on tense. Consequently, this may have conferred an advantage to Deaf learners in this particular task.

In the sentence analogy task, learners were asked to provide the past tense forms of irregular verbs. However, they scored low in this task compared to the other two tasks. Irregular verbs can be quite challenging to learn as there is no consistent or regular pattern in their formation. Hearing learners outperformed Deaf learners in this task since they have an advantage of oral exposure to these words. They hear these words more frequently, possibly making it easier to match them to print. Therefore, it is reasonable to expect hearing learners to perform better than Deaf learners on this task.

It may be inferred that the English MA of Deaf and hearing Grade 3 to 7 learners in Lesotho relating to inflectional morphology is not strong. The learners' inability to adequately inflect pseudo-words indicates a lack of strong inflectional awareness, as they could not apply their knowledge of morphology to manipulate these pseudo-words. The mean score on inflectional awareness tasks for the Deaf school was 15.1% and 14.7% for the hearing school. These scores are low, especially considering that learners from higher grades were included.

5.2.1 Learner performance on derivational morphology tasks

The learners from both schools participating in this research achieved marginally higher scores on derivational awareness tasks in comparison to their performance on tasks assessing inflectional awareness. This difference was statistically significant. The current results contradict findings

from previous studies conducted on hearing learners learning English as a second language (Carlisle, 2003; Zhang & Koda, 2013), as well as Deaf learners (Gaustad & Kelly, 2004), which indicate that learners' awareness of derivational morphology develops at a slower rate compared to their awareness of inflectional morphology, possibly due to the greater complexity of derivational morphology. Derivational morphology is more complex because it changes meanings.

This study found no statistically significant difference in the performance of Deaf and hearing learners on derivational awareness tasks. These results also challenge the literature, which suggests that hearing learners exhibit superior development of derivational awareness compared to Deaf learners (Gaustad & Kelly, 2004; Gaustad et al., 2002). As shown in 2.2.2, Gaustad and Kelly (2004) revealed that hearing middle school students outperformed Deaf college students in English derivational morphology knowledge. This current study assessed the derivational awareness of Deaf and hearing participants in the same grade levels. Contrary to findings reported by Gaustad and Kelly (2004), Deaf and hearing learners in this study performed similarly.

The derivational awareness tasks included the morpheme identification task and the word analogy task. Hearing learners and Deaf learners performed similarly on both tasks. As stated in 3.5.1.4, I hypothesised that Deaf learners would perform better than hearing learners on the word analogy task. This is because the English morphological process used to derive nouns from verbs in this task is comparable to that used in LSL. However, these results have invalidated my hypothesis.

The English MA of Deaf and hearing Grade 3 to 7 learners in Lesotho relating to derivational morphology is relatively weak. Although derivational morphology is more complex and could be challenging for younger learners, the poor performance of learners in higher grades suggests a weak derivational awareness among these learners. As shown in 4.2, Deaf learners scored an average of 26%, and hearing learners scored 26.5% on the derivational awareness tasks.

5.2.2 Learners' performance on compound morphology task

Both groups performed better on the compound awareness task than the other MA tasks. In this task, learners were required to choose the correct answer from two options, as indicated in Section 3.5.1.5. Due to the binary nature of this task, learners had a 50% chance of getting the answer

correct; for example, when asked, “What do you call a tree that grows apples? A tree apple or an apple tree?” the possible answers were “tree apple” or “apple tree”. If learners were uncertain about the answer, they could have used a random selection strategy by choosing one of the two available options. The probability was evenly split between two outcomes. However, looking at the scores (hearing learners achieved a mean score of 64%, and Deaf learners got 53.1%), it can be observed that if the learners had purely guessed all their answers, their average score would have approximated 50%. They achieved above 50%, indicating some evidence of compound awareness. This is particularly true for hearing learners. The fact that the Deaf learners’ scores are only marginally above 50% provides less evidence of compound awareness.

Section 2.2.3 highlighted that compounding is prominent in sign languages, as in Chinese. The section showed that Chinese L1 learners learning English as a second language demonstrate strong proficiency in English compound awareness (Lam et al., 2012). I had predicted that Deaf learners in this study would also exhibit a high level of competency in English compound awareness, given that their first language (LSL), similar to Chinese, is known for its extensive use of compounding. Contrary to expectations, Deaf learners did not perform well.

5.3 Morphological Awareness contribution to English reading comprehension

The results presented in 4.2 show that both Deaf and hearing learners had a low performance score on the reading comprehension task. This is understandable because their low scores on the MA tasks also suggests that they may not have a strong awareness of morphology. The literature review chapter highlights the importance of teaching morphology to improve the reading comprehension of both Deaf and hearing learners, as demonstrated by various studies (Deacon & Kirby, 2004; Kuo & Anderson, 2006; Rothou & Padeliadu, 2015; Trussell, 2014; Trussell & Easterbrooks, 2017). This current research corroborates the findings of these studies. The results from this study show a significant correlation between MA and reading comprehension for both Deaf and hearing learners.

Even though this study’s findings demonstrate that together, inflectional awareness, derivational awareness, and compound awareness significantly predict reading comprehension, it was shown that only inflectional awareness and derivational awareness provide distinct and significant

contributions. Derivational awareness makes a larger contribution compared to inflectional awareness. The findings presented in this study provide empirical support for the literature that posits the superior impact of derivational awareness on comprehension compared to inflectional awareness in both Deaf and hearing learners (Lee et al., 2023; Zhang & Koda, 2013). Inflectional awareness pertains to accurately associating a given word with its corresponding grammatical environment. Derivational awareness, on the other hand, focuses more on the significance of meaning in terms of the grammatical function of a word. The differentiation between the terms *teach* and *teacher* significantly influences the communicated meaning. As a result, it is reasonable to conclude that derivational awareness has a greater impact on reading comprehension than inflectional awareness, considering how important it is to meaning.

The Deaf learners outperformed the hearing learners on the comprehension task. This contradicts previous literature that suggests that Deaf learners lag behind hearing learners in literacy skills (Hassanzadeh & Nikkhoo, 2019; Van Staden, 2013). It is interesting that Deaf learners performed better than hearing learners, considering that the overall MA performance of hearing learners was better. Section 4.3 demonstrated that the linear regression analyses conducted in both the Deaf and hearing schools showed compound awareness did not predict comprehension. As previously indicated, the overall MA performance of hearing learners was better. However, this score was inflated by their strong performance on the compound awareness task. The total performance of hearing learners' inflectional and derivational awareness tasks, excluding the compound awareness task, was lower than that of Deaf learners. And as indicated, inflectional and derivational awareness contribute more to reading than compound awareness. This explains why, in comparison to hearing learners, Deaf learners have better reading comprehension skills but lower MA overall.

Written MA contributes to the English reading comprehension of Deaf and hearing Grade 3 to 7 learners in Lesotho. The learners' written inflectional and derivational awareness significantly contributes to their English reading comprehension. The learners do not have strong inflectional and derivational awareness, as indicated in 5.2 and 5.2.1, which hampers their English reading comprehension proficiency.

5.4 Errors made by Deaf and hearing learners on MA tasks

The errors made by the learners were classified into different categories, as presented in section 3.6. In the current section (5.4), these errors are analysed to assess whether there are similar challenges in the English morphological acquisition of Deaf and hearing learners. The analysis also aims to determine the extent to which the learners' home language influences their English MA.

In the wugs task, the most prevalent error category was the 'incorrect addition of the morpheme'. This category was prevalent in both schools. In this task, learners would incorrectly add *-s* instead of *-es* to semi-regular pseudo-nouns to pluralise them. For example, they would write *Gutchs* instead of *Gutches* as the plural form of *Gutch*. These findings suggest that learners from both schools have not fully grasped the process of pluralising semi-regular nouns. Both groups also appeared to lack a complete understanding of irregular verbs. This task's next prevalent error category was the 'repeat of stimulus'. This category was prevalent not only in the wugs task but also in the test of inflectional morphology on pseudo-verbs, the word analogy task, and the sentence analogy task.

This category was generally predominant in all MA tasks, excluding the morpheme identification task and the compound awareness task. Learners were asked to distinguish the morphemes with a slash in the morpheme identification task, as indicated in section 3.5.1.3. Therefore, repeating the stimulus when answering the question was improbable. In the compound awareness task, learners were instructed to circle a word that matched the meaning of a question or scenario they were given. Similarly to the morpheme identification task, learners were unlikely to repeat the stimulus when completing this task. In fact, in the compound awareness task, it would be impossible to repeat the stimulus because both options given were different from the stimulus.

There could be several possibilities for learners making this error. For instance, learners may not have been concentrating when the task was explained or may have misunderstood the task but did not ask the person to repeat the instruction for some reason, so they just copied the stimulus and wrote it down as their answer. Additionally, learners may develop strategies to get through tasks with the least effort, which can affect comprehension. Therefore, learners in this study may have

thought that a quick way of completing the task was to repeat the stimulus. Moreover, learners may have thought that a zero morph should be added to inflect or derive the word. This is especially the case for Deaf learners. As mentioned in 4.4, the 'repeat of stimulus' error category accounted for 81% of the errors made by Deaf learners in the test for inflectional morphology on pseudo-verbs. This provides evidence of LSL influence since verbs are not inflected for tense in LSL. The learners may have used the same technique here, thus repeating the verbs (stimulus) and not changing the tense as instructed.

In both the sentence and word analogy tasks, the 'repeat of the example' was found in both schools. As indicated in the methods chapter (3.5.1.4), participants were given two examples for each task. In these tasks, learners replicated the provided examples and wrote them as answers. It is possible that learners who made this error shared similar reasons to those who repeated the stimulus, except for the possibility that the learners may have thought that a zero morph should be added to inflect or derive the word.

In the sentence analogy task, one of the categories with the highest number of errors was the 'overgeneralisation' category in both schools. Instead of writing *drank*, the learners would, for instance, add the regular past tense morpheme *-ed* to *drink* to form *drinked*. These errors were observed across grades, including higher grades, suggesting that irregular nouns and verbs are not effectively taught to learners. The 'simplification' category was another prominent error category in the sentence analogy task. This error category was observed in the hearing school. In contrast to hearing learners, Deaf learners did not make this error. The learners would change words to their present progressive tense form instead of the past tense. For example, they would write the past tense of *begin* as *beginning* instead of *began*. This tense can be regarded as simpler and is typically introduced in the early stages of English learning. The fact that Deaf learners did not make this error could suggest that they may have less exposure to present progressive tense than hearing learners. The present progressive tense is commonly used in spoken English in everyday conversations.

In the word analogy task, the 'applied inflectional morpheme' category of error was also found only in the hearing school. To derive nouns from verbs, some hearing learners added the plural

morpheme -*s* instead of the derivational morpheme -*er*. For example, some answers were, *if I sing. I am a sings* (instead of *singer*), or *Thato works on a farm. He is a farms* (instead of *farmer*). As indicated in Section 2.2.1, learners typically acquire inflectional morphology before derivational morphology (although this study did not provide evidence to support this claim). It is possible that the learners who made this error found it easier to attach this inflectional morpheme than the appropriate derivational morpheme.

Conversely, Deaf learners did not make this error, suggesting that they might possess a more well-developed understanding of the distinction between the plural morpheme -*s* and the derivational morpheme -*er*, as well as a better understanding of when to use them. Some hearing learners added -*r* instead of -*er* to verbs in this task. This error was categorised as the 'incorrect representation of the morpheme'. This is the third predominant error category in this task at the hearing school. Deaf learners did not make this error, further indicating that they are more aware of the morpheme -*er* than hearing learners. This could also be attributed to oral influence. For example, for hearing learners, the word *dancer* is articulated without the sound /e/. Consequently, *dancr* may seem reasonable to them as it is how they pronounce it orally. On the other hand, Deaf students rely on the words' written form, which likely explains their knowledge of the accurate representation.

In the sentence analogy task, the 'incorrect spelling' category was found only at the hearing school but not at the Deaf school. In this task, learners misspelt the correct morpheme; this was coded as 'incorrect spelling'. Learners wrote words such as *sow* or *soo* instead of *saw*. This could also be attributed to phonological influences. The hearing learners were likely to be aware that the past tense of *see* is *saw* due to their oral exposure to the word, but they may lack knowledge of its correct spelling. The Deaf learners, however, may not have been familiar with the phonological shape of the word, which could explain why they made different errors instead of this one.

In the wugs task, a test of inflectional morphology on pseudo-verbs, and the sentence analogy task, another category identified in the hearing school was the 'completely incorrect' category. The learners wrote random answers such as *irat*, *wra*, *fanne*, *farpo*, *ama*, *heisa*. For example, in the sentence analogy task, a learner gave *irat* as a past tense irregular form of *drink*. This observation suggests that some learners may lack proficiency in writing English words. While they can write

and connect individual letters, they struggle with composing real words. This error category was far more prevalent at the hearing school than at the Deaf school. At the Deaf school, this error was made once by one learner on the wugs task. The learner wrote *gntbnoe* as a plural form of *niz*. Given that the error occurred in the wugs task, it is plausible to assume that the learner recognised that the words used were not real words and consequently provided a non-real word as their answer. This suggests that Deaf learners may have a better understanding of the distinction between real English words and pseudo-words.

In the morpheme identification task, the predominant error category in both schools was the 'arbitrary marking on the word' category. There was no discernible pattern in how learners made markings on words, for example, *Disres/pectful* instead of *Dis/respect/ful*. This category was followed by the 'lexical isolation' category. Learners from both schools isolated lexical items within words; for instance, they marked 'table' in uncomfortable, 'have' in misbehave, 'ill' in *illegal,* instead of *un/comfort/able*, *mis/behave* and *il/legal*. Another category found in this task in both schools was the 'incomplete identification of the morphemes' category. In this case, the learners failed to correctly identify all morphemes, for example, *disrespect/ful* or *dis/respectful* instead of *dis/respect/ful*. Among these three error categories (the 'arbitrary marking on the word' category, the 'lexical isolation' category and the 'incomplete identification of the morphemes' category), the 'arbitrary marking on the word' category accounted for over 75% of errors made on this task in each school. These findings suggest that morphological instructions are possibly not explicitly taught alongside other metalinguistic skills in both schools. This assertion is based on the fact that the learners in this study struggled to isolate or identify individual morphemes.

In the test of inflectional morphology on pseudo-verbs and the word analogy task, the 'additional vowel in the word-final position' category was observed in both schools. In the word analogy task, learners wrote answers such as *farmo*, *farma,* or *farme* instead of *farm*. In the test of inflectional morphology on pseudo-verbs, they wrote words like *mote* or *motti* instead of *mott*. This error was more prevalent in the hearing school compared to the Deaf school. The presence of an additional vowel in the last position of a word in the answers of hearing learners makes sense, as Sesotho words, particularly verbs, typically end with vowels. This may indicate a transfer from Sesotho. There may exist situations in which this is also conveyed to Deaf learners somehow. Deaf learners

grow up in a Sesotho-speaking environment throughout their lives. While it may appear that they are not receiving any Sesotho language input from our perspective, they may be receiving such input. Although the specific nature of these exposures remains uncertain, it is plausible to suggest the existence of potential instances of Sesotho exposure. It could be the effects of residual hearing. Although most of the learners are born deaf or are prelingually deaf, there is some variation in their hearing abilities, as indicated in Section 1.3. Not all of them will experience complete hearing loss, indicating the likelihood of some influence from Sesotho. Another possibility is that the learners may also be exposed to written Sesotho, which could potentially influence their word formation in English.

In the word analogy task, learners made an error that might have also been due to the influence of another language. In this task, there were instances where learners wrote, *My mother bakes cakes. She is a bakeser* (instead of a *baker*), or *Thapelo drives a bus. He is a driveser* (instead of a *driver*). This was observed in both schools. The likelihood of this error being influenced by LSL would have been greater if it had been made exclusively by Deaf learners. As stated in section 2.6, LSL employs a similar morphological process to form nouns from verbs. In LSL, the first, second and third-person present singular and plural verbs are represented by the same sign; for example, the words 'sing' and 'sings' are both represented by the sign SING. To sign the word SINGER, one must add the sign for PERSON to SING to form a noun in both cases, whether *singer* is derived from *sing* or *sings*. The signer does not alter the verb sign as they would alter the verb in English (by first removing *-s* from *sings* before adding *-er*). In the previously given examples (*bakes-bakeser* and *drives-driveser*), the learners had to be aware that the noun forms for *drive* and *drives* are the same, as are the noun forms for *bake* and *bakes*. Considering that this error was observed in both schools, an alternative explanation could be that the learners, both Deaf and hearing, have not completely grasped the rule of adding *-er* to verbs to form nouns. Therefore, this error may be attributed to either a transfer from LSL or an incomplete grasp of the rule among Deaf learners. However, among the hearing group, it could be an incomplete grasp of the rule.

5.5 Chapter summary

This chapter demonstrates that the Deaf and hearing learners have relatively weak inflectional, derivational and compound awareness. The chapter shows a statistically significant relationship

between MA and reading comprehension in Deaf and hearing learners. It is worth noting that even though hearing learners had a better overall MA performance, Deaf learners outperformed them on the comprehension task. The chapter also revealed that the most prominent error categories were shared among the two groups. However, a few categories of errors were exclusive to each school. There is some evidence of influence from the first languages of both Deaf and hearing learners. Additionally, some evidence suggests that phonological effects may influence some errors in hearing learners. In the conclusion chapter, I expand on these findings and show areas where future research can be developed from this study.

Chapter 6: Conclusion

6.1 Overview

This study investigates written English MA in Deaf and hearing Grade 3 to 7 learners from Lesotho and the relationship between the learners' MA and reading comprehension ability. By shedding light on how MA works for both Deaf and hearing learners, this study provides valuable insights for future research and highlights the importance of teaching MA. Additionally, this research contributes to the evidence of the importance of MA to reading comprehension in both Deaf and hearing learners. In this chapter, I describe the key insights that arose from the findings of this study in 6.2. I then describe the limitations and possibilities for future research in 6.3. Finally, I conclude with suggestions for how MA can be improved for better literacy in Lesotho in 6.4.

6.2 Key findings

This study provides valuable insights into MA and its development in Deaf and hearing learners. Investigating this topic is particularly interesting since these learners acquire English morphology through two different modalities. Deaf learners generally acquire morphology through orthography, while hearing learners acquire it through speech and orthography. The study's findings demonstrate that the Deaf and hearing learners performed poorly in the tasks, suggesting a lack of proficiency in MA and reading comprehension among the learners. The results align with the findings reported in Lesotho's literacy literature (as shown in 1.2), which indicates low literacy levels among learners in the country.

It appears that Deaf learners in Lesotho do not face any inherent disadvantage in terms of their literacy development relating to MA and reading comprehension compared to hearing learners. The research findings reveal no significant difference in the MA of the Deaf and hearing learners. This outcome contradicts research that indicates that Deaf learners typically exhibit lower levels of MA and reading comprehension compared to their hearing peers (Clark et al., 2011; Gaustad & Kelly, 2004; Hassanzadeh & Nikkhoo, 2019; Laçin et al., 2018; Van Staden, 2013).

This study's results suggest a statistically significant relationship between MA and reading comprehension in Deaf and hearing learners. This supports the research that argues that MA is

essential for reading comprehension (Deacon & Kirby, 2004; Kuo & Anderson, 2006; Nagy et al., 2003; Trussell, 2014; Zhang et al., 2023). Interestingly, the study results also show that Deaf learners achieved a higher comprehension score despite having a lower MA score overall compared to hearing learners. However, as indicated in 5.3, hearing learners' MA scores were inflated due to their strong performance on the compound awareness task relative to Deaf learners. Most of the variations between the Deaf and hearing learners are due to their performance on the compound awareness task. Deaf and hearing learners' results are comparable; the compound awareness task (which was not the best task, as indicated in 5.2.3) sets them apart.

The results from both groups show that only inflectional and derivational awareness, not compound awareness, made unique contributions to reading comprehension. Moreover, the results show that derivational awareness contributed more significantly than inflectional awareness. Inflectional and derivational awareness are especially important in English, as compounding is less common in this language than in sign languages. These findings suggest that inflectional and derivational awareness should be prioritised in schools when teaching morphology to improve learners' ability to extract meaning from what they read.

The findings of the error analysis conducted on the learners' MA tasks show that the most prominent error categories were shared among the two groups. In contrast, some less prominent ones were unique to the Deaf or hearing group. The most prevalent error category observed in all tasks that required learners to fill in an answer was the 'repeat of stimulus' category. The prevalence of this error can be attributed to several factors, as outlined in 5.4. These factors include lack of concentration during task explanation, failure to seek clarification on task instructions, mindless copying of words without comprehension, adoption of a strategy to minimise effort, and the belief that a zero morph should be added to inflect or derive the word. Additional research is necessary to thoroughly examine the fundamental factors contributing to this error's frequent occurrence among learners.

Some instances in this study suggest a certain level of influence from the L1s of both Deaf and hearing learners (Sesotho and LSL, respectively). As detailed in Section 5.4, there was evidence of influence from the learners' L1s in the errors they made. The influence of LSL was apparent in

the word analogy task, where Deaf learners incorrectly added the suffix *-er*. They used a technique employed in LSL for deriving nouns from verbs. Adding an agentive suffix is comparable to using compounds headed by the word PERSON in LSL. Adding PERSON to TEACH indicates *teacher* in LSL, the same way adding *-er* to *teach* forms the noun *teacher* in English. As demonstrated in section 5.4, it is likely that Deaf learners were not aware that they needed to modify certain verbs before applying the *-er* morpheme. This involved removing the *-s* in some cases before adding *-er*. In LSL, the same sign represents the first, second, and third-person present singular and plural verbs. To form a noun from these verbs, one must add the sign for PERSON to the verb. The signer does not alter the verb sign as they would alter the verb in English. More evidence of LSL influence was observed on the test for inflectional morphology on pseudo-words. In this task, the majority of errors made by the Deaf learners was repeating the stimulus. As discussed in 5.4, verbs are not inflected for tense in LSL, so Deaf learners possibly used the same technique here, thus repeating the verbs (stimulus) as they are and not changing the tense as instructed. Some errors made by Deaf and hearing learners showed influence from Sesotho, as they would add a vowel at the end of a word in their answers. This is because verbs in Sesotho end with vowels. Lesotho educators should consider the learners' L1s when teaching English morphology and assess the errors that demonstrate L1 influence. This will enable them to assist learners in reducing such errors.

6.3 Limitations and suggestions for future research

Based on the low scores on the tasks, it appears that the learners were not adequately prepared to be tested on irregular English words, particularly given that English is their second language. It is possible that they needed to have reached a certain literacy level before being assessed on this type of morphological construction. During the data collection process, it was observed that a large proportion of learners in both schools were unable to read, which led to their inability to complete some tasks, mainly the comprehension task. A Lesotho policy (as shown in 1.2), which prohibits learners from failing and repeating grades, has resulted in learners who cannot read, even in higher grades. Future researchers should consider this when creating literacy assessment tasks for similar studies.

This study's sample size was small, especially regarding Deaf learners. The study was constrained because it dealt with an atypical population. Conducting a more extensive study on a larger scale

involving all four Deaf schools in Lesotho, for example, would benefit future research on assessing MA in Deaf learners and how it develops in these learners. The assessment of MA development in this current study involved examining different grade levels, as this research was cross-sectional. However, to achieve a more precise depiction of the development of MA among Deaf learners in Lesotho, future researchers should also consider conducting a longitudinal study. This type of research could also help identify specific challenges and opportunities for these learners to improve their literacy skills. Additionally, it could enable educators and policymakers to create more effective interventions and support systems.

As mentioned in Section 5.2.2, learners were given a choice between two options in the compound awareness task. This could have led to guessing and provided an inaccurate representation of the learners' compound awareness. For future research, a different task should be conducted to assess compound awareness. For instance, learners could be instructed to provide the answer themselves instead of being given options to choose from. Although this study indicated that compound awareness did not contribute to English reading comprehension, the limitation of the compound awareness task means that one cannot rely too heavily on the findings to conclude that compound awareness does not contribute to reading comprehension. A better compound awareness task is needed to ascertain whether or not compound awareness contributes to reading comprehension.

In addition to MA, several additional literacy skills contribute to English reading comprehension, including PA, vocabulary knowledge, word reading, and syntactic knowledge (Brimo et al., 2017; Dong et al., 2020; Lipka & Siegel, 2012; Silvia Cárnio et al., 2017). This study was limited to the investigation of one literacy skill, MA. There is a need for a study that includes different literacy skills and investigates how they contribute to reading success for Deaf and hearing learners. Future research should also conduct an intervention study to see how these different literacy skills can be taught and developed to examine their effectiveness and the impact that improving them has on the learners' reading comprehension development.

By only conducting literacy assessment tasks, one only acquires limited knowledge of the context of the school. There is a lack of comprehensive understanding of the state of affairs within the school, including the quality of instruction. Within the Deaf school, for example, there are

additional complexities of political dynamics. This might also be the case in the hearing school, although the complexities surrounding deafness create more room for conflict in a Deaf school than in a hearing school. For instance, there might be conflict between Deaf learners and hearing teachers in the school. Deaf learners may experience a certain degree of dissatisfaction with their teachers because they may not feel well-respected. For future research, it is essential to consider these factors in conjunction with literacy assessment tasks (Van Der Berg et al., 2016). A type of research that could examine these factors more fully is ethnographic research.

6.4 Morphological Awareness for Better Literacy in Lesotho

There is a noticeable literacy crisis observed in both Deaf and hearing learners from Lesotho. In this context, explicit English morphological instruction may be helpful to improve literacy. Several studies (Breadmore, 2007; Breadmore et al., 2012; Hennenfent et al., 2022; Trussell & Easterbrooks, 2017; Wolter & Green, 2013) suggest that explicit morphological instruction is necessary to improve language and literacy skills, including comprehension, spelling, word recognition, and vocabulary development. Further research is needed to determine the impact of an explicit MA intervention in Lesotho. If explicit MA instruction is found to be effective, it will be crucial to provide this instruction to both Deaf and hearing learners in Lesotho to potentially improve their literacy development and address the literacy crisis in the country.

One of the key findings of this study is that there is a statistically significant relationship between MA and reading comprehension in both Deaf and hearing learners in Lesotho. Although inflectional awareness is argued to be crucial for the reading comprehension of Deaf and hearing learners of English, derivational awareness was shown to be most predictive of reading comprehension. These findings align with studies that suggest that education on derivation holds greater significance and should be consistently maintained due to its positive effects on reading comprehension skills (Amirjalili & Jabbari, 2018; Zhang et al., 2023). Therefore, derivational awareness could be strengthened in Deaf and hearing schools in Lesotho to give learners more access to meaning from written text. For example, learners could be given activities, such as word formation exercises for complex words, to help them recognise patterns in word structure. Considering that more than 50% of English words consist of complex morphology (Wolter &

Green, 2013), mastering the morphological system of English is necessary for learning the language. It could benefit Lesotho Deaf and hearing learners' comprehension skills.

6.5 Chapter summary

This study illuminates the MA and reading comprehension level among Deaf and hearing Grade 3 to 7 learners from Lesotho. The study found that both Deaf and hearing learners scored low on the tasks, suggesting a lack of MA and reading comprehension proficiency. The findings suggest a statistically significant relationship between MA and reading comprehension in both Deaf and hearing learners, with derivational awareness being more predictive of reading comprehension. In light of these findings, derivational awareness should be prioritised in schools alongside inflectional awareness when teaching morphology to improve learners' ability to extract meaning from what they read and thus facilitate literacy development in Lesotho. The prominent error categories were similar across both the Deaf and hearing schools. Overall, this study contributes to the evidence of the importance of MA in reading comprehension and provides valuable insights for future research, as well as potential improvements in the teaching of MA for better literacy in Lesotho.

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List of Appendices

Appendix A1

Parents and Guardians' consent form (with Sesotho translation)

Appendix A2

Biographical questionnaire for Deaf learners who have received consent from parents

Appendix B1

Task 1: The 'Wugs' task (1a) and a test of inflectional morphology on pseudo-verbs (1b)

Appendix B2

Task 2: A morpheme identification task

Appendix B3

Task 3: A word and sentence analogy task

Appendix B4

Task 4: A compound awareness task

Appendix B5

Task 5: A reading comprehension task

Appendix A1

PARENT AND GUARDIAN'S INFORMED CONSENT

INFORMED CONSENT DECLARATION

(Parent or Guardian)

Puleng Tšehla from the Department of Linguistics and Applied Language Studies, Rhodes University, has requested my permission to allow my child/ward to participate in her research project.

The nature and the purpose of the research project and this informed consent declaration have been explained to me in a language I understand.
I am aware that:

1. The purpose of the research project is to study Deaf and hearing learners' awareness of meaning units in English; for example, the word *unhappy* is made up of two meaning units, *un-* which means negative/not and *happy* which means 'to be happy'.

2. By participating in this research project, my child/ward will contribute towards a better understanding of literacy amongst learners, which will help my child/ward and other children with their education.

3. My child/ward will participate in the project by completing a set of literacy assessment tasks that will be in the form of word games.

4. My child's participation is entirely voluntary.

5. My child's anonymity will be maintained. No identifying personal information will be collected from them, so they will not be identifiable from the results of the tasks that they complete.

6. Should my child/ward or I wish to withdraw from participating further at any stage, we may do so without any negative consequences.

7. My child/ward's data may be reused in another follow-up study, provided the study adheres to ethical standards similar to this one.

8. Any further questions I might have concerning the research or my participation will be answered by Ms Puleng Tšehla at +26669499707/+27717316774. I may also contact the Rhodes University Ethics coordinator at +27466037727 or ethics-committee@ru.ac.za.

I, ……., have read the above information / confirm that the above information has been explained to me in a language that I understand, and I am aware of this document's contents. I have asked all the questions I wished to ask, which have been answered to my satisfaction. I fully understand what is expected of my child during the research.

I have not been pressured in any way to let my child take part. By signing below, I voluntarily agree that my child/ward …… (**insert name of child**), who is …… years old, may participate in the project mentioned above.

……. …….

Parent/Guardian's signature **Date**

Rhodes University, Research Office, Ethics
Ethics Coordinator: ethics-commitee@ru.ac.za
t: +27 (0) 46 603 7727 f: +27 (0) 86 616 7707
Room 220, Main Admin Building, Drostdy Road, Grahamstown, 6139

Tumello ea motsoali ho re ngoana a nke karolo phuputsong
(Motsoali)

Puleng Tšehla ho tsoa lekaleng la thuto ea lipuo, sekolong se phahameng sa Rhodes University o kopile tumello eaka hore ngoanaka a nke karolo phupotsong ea hae.

Morero oa phuputso ena le tokomane ena ke li hlaloselitsoe ka puo eo ke e utloisisang.

Kea lemoha hore:

1. Lebaka la porojeke ena ke ho sheba le hona ho hlahloba hore na baithuti ba na le temoho ea hore ka hare ho lipuo mantsoe a bopuoe ka likarolo tse jereng tlhaloso, mohlala, puong ea sekhooa lentsoe *unhappy* le entsoe ka likarolo tse peli tsa tlhaloso. *Un-* e bontshang ketsollo le *happy* e bolelang thabo.

2. Ka ho nka karolo porojekeng ena, ngoanaka o tla be a kenya letsoho ntlafatsong ea thuto ea hae ‘moho le ea baithuti ba bang.

3. Ngoanaka o tlo nka karolo ka ho phetha litlhatlhojoana tseo a tlang ho li fuoa mabapi le thuto ea bana ba nang le bokooa ba kutlo le puo ha ho tluoa ntlheng ea ho bala le ho ngola.

4. Ngoanaka ha a hapeletsoa ho nka karolo porojekeng ena.

5. Ha ho moo lebitso la ngoana oaka le tla hlaha liphethong tsa porojeke ena.

6. Ha nna kapa ngoanaka re ka batla ho lokolloa ho se tsoelepele porojekeng ena nako efe kapa efe, re ka etsa joalo ntle ho litlamorao life kapa life.

7. Liphetho tsa ngoanaka porojekeng ena li tla sebetsa hape porojekeng e ts'oanang le ena hafela e ikamahanya le melao ea ts'ireletso ea ngoana joaloka porojeke.

8. Lipotso tseo nka bang le tsona mabapi phuputso ena le li tla arabuoa ke mofumahali Puleng Tšehla nomorong ea +26669499707/+27717316774. Nka letsetsa le Ethics coordinator ea Rhodes University nomorong ea +27466037727 kapa nka romella molaetsa ho ethics-committee@ru.ac.za.

Nna, …….. ke balile litaba tse ngotsoeng holimo/ke tiisa hore litaba tse ngotsoeng holimo ke li hlaloselitsoe ka puo eo ke e utloisisang 'me ke hlaketsoe ke litaba tse hlalositsoeng. Ke butsitse lipotso tsohle tseo ke neng ke lakatsa ho li botsa 'me ke khotsofalletse likarabo tseo ke li fuoeng. Ke utloisisa se lebelletsoeng ho ngoanaka ka ho nka karolo phuputsong ena

Ha kea susumeletsoa ho lumella ngoanaka ho nka karolo porojekeng ena. Ka ho tekena mona, ke lumela hore ngoanaka …… (**ngola lebitso la ngoana**), ea lilemo li ……., a ka nka karolo mosebetsing o hlalositsoeng holimo.

……. …….

Tekeno ea motsoali **Letsatsi**

Rhodes University, Research Office, Ethics
Ethics Coordinator: ethics-commitee@ru.ac.za
t: +27 (0) 46 603 7727 f: +27 (0) 86 616 7707
Room 220, Main Admin Building, Drostdy Road, Grahamstown, 613

Appendix A2

Biographical questionnaire

Please administer this using LSL and fill in the learner's responses.

School

Deaf School	Hearing School

Name and Surname

Assigned Code (Do not ask the learner for this!)

Self-reported Age

Grade

3	4	5	6	7

Gender (Do not ask the learner!)

Male	Female	Unassigned

Other

Appendix B1

TASK 1 (a)

Look at the images below and fill in the blank spaces.
Look at the examples below.

a.

THIS IS A **WUG**

NOW THERE IS ANOTHER ONE.
THERE ARE TWO OF THEM.
THERE ARE TWO **WUGS**.

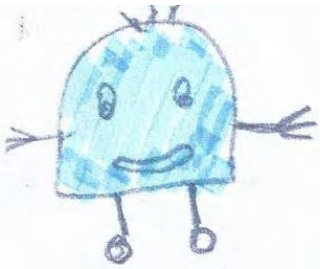
Now try it on your own. Look at the images below and fill in the blank spaces:

1.

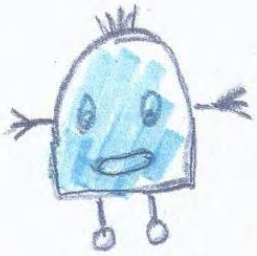
THIS IS A **CRA**

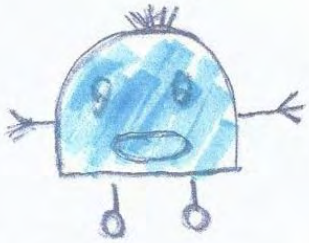
NOW THERE IS ANOTHER ONE.
THERE ARE TWO OF THEM.
THERE ARE TWO _____.

2.



THIS IS A GUTCH.





NOW THERE IS ANOTHER ONE.
THERE ARE TWO OF THEM.
THERE ARE TWO _____.

3.

THIS IS A TOR.

NOW THERE IS ANOTHER ONE.
THERE ARE TWO OF THEM.
THERE ARE TWO _____.

4.

THIS IS A NIZ.

NOW THERE IS ANOTHER ONE.
THERE ARE TWO OF THEM.
THERE ARE TWO _____.

5.

THIS IS A KAZH.

NOW THERE IS ANOTHER ONE.
THERE ARE TWO OF THEM.
THERE ARE TWO _____.

TASK 1 (b)

Fill in the missing word. Look at the examples below.

a. Ben is **stotting** the ball. Yesterday he **<u>stotted</u>** the ball.

b. The girl is **spowing**. Tomorrow she will **<u>spow</u>**.

Now, try it on your own. Fill in the missing word:

1. The monkeys are **glinging**. Tomorrow they will _____.

2. The bird is **flamping**. Yesterday it _____.

3. Yesterday the man **tufed**. Today he is _____.

4. Thabo is **motting**. Tomorrow he will _____.

5. The lady is **knoping** the flower. Yesterday she _____ the flower.

Appendix B2

TASK 2

Use a slash (/) to break these words into parts that each have their own meaning.

Let us look at these examples:

a. Un/safe

b. Childish

Now try it on your own:

1. Disrespectful

2. Helpful

3. Rewrite

4. Uncomfortable

5. Punishment

6. Impossible

7. Unkindness

8. Wooden

9. Misbehave

10. Illegal

Appendix B3

TASK 3

Fill in the blank spaces with the correct word.
Let us look at the examples below:

a. I **laugh**, he **laughed.**

   I **eat**, he **ate.**

b. Mpho **gives** the ball to Mosa, Mpho **gave** the ball to Mosa.

   Mpho **sings** to Mosa, Mpho **sang** to Mosa.

Now, try on your own. Fill in the blank spaces with the correct word.

1. I **walk**, she **walked**

   I **run**, she _____.

2. The teacher **talks** to them, the teacher **talked** to them.

   The teacher **writes** to them, the teacher _____to them.

3. Ts'epo **helps** Neo, Ts'epo **helped** Neo.

   Ts'epo **sees** Neo, Ts'epo _____ Neo.

4. The dog **barks** at Thabo, the dog **barked** at Thabo.

   The dog **drinks** water, the dog _____ water.

5. The class will **end** at 3 today, the class **ended** at 4 yesterday.

   The class will **begin** at 8 today, the class _____ at 9 yesterday.

Complete the following sentences by filling in the correct word. Let us look at the examples below:

a. If I **teach**, I am a **teacher.**

b. If I **dance**, I am a **dancer.**

Now, try on your own. Fill in the blank spaces with the correct word:

1. If I **sing**, I am a _____.
2. Thato works on a **farm**. He is a _____.
3. She **writes**. She is a _____.
4. My mother **bakes** cakes. She is a _____.
5. Thapelo **drives** a bus. He is a _____.

Appendix B4

TASK 4

Circle the correct answer. Let us look at the examples below:

a. What do you call **a cloth** that is used to cover the **table**?

A clothtable or (a tablecloth) ?

b. Some people wear **rings** on their **ears**. What do we call them? earings or ringears?

Now, try on your own. Circle the correct answer.

1. What do you call a **tree** that grows **apples**?
   A tree apple or an apple tree?

2. What do you call a **book** where you write your **notes**?
   A notebook or a booknote?

3. What do you call a **cup** that is used to drink **tea**?
   A teacup or a cuptea?

4. What do you call a **brush** used to clean your **teeth**?
   A brushtooth or a toothbrush?

5. What do you call a **spoon** used for putting sugar in your **tea**? A teaspoon or a spoontea?

6. What do you call a **room** you use to **bath**?
   A bathroom or a roombath?

7. What do you call a **towel** you use to wash your **face**?
   A towel face or a face towel?

8. What do you call a **coat** you wear to protect you from **rain**?
   A coatrain or a raincoat?

9. What do you call a **bag** you use for **school**?
   A schoolbag or a bagschool?

10. What do you call a **polish** you use to paint **nails**?
    Nail polish or polish nail?

Appendix B5

TASK 5

Read the short story below. Then answer the questions.

Grandfather's Cooking

Lerato loves her grandfather. He lives in Roma and comes to visit once a month. She wishes he came to visit every week because he tells great stories and makes her favourite dinner.

Lerato asks her mom to make the fried chicken that her grandfather makes. Lerato's mom says, "I will try, but no one makes it as well as your grandfather does".

Lerato watches her mom prepare the sauce for the chicken. It looks tasty. When the chicken and rice finish cooking, Lerato's family sits down to eat. Her mom was right. No one makes the fried chicken as well as her grandfather. After eating, Lerato and her sister wash the dishes.

The next time her grandfather comes to visit, Lerato tells him the story about her mom trying to make the chicken. Her grandfather says, “That is a great story”. He decides to teach Lerato and her mom how to make the chicken.

Lerato and her mom make the fried chicken once a week. It still does not taste quite as good as Lerato’s grandfather’s fried chicken. Lerato loves her grandfather.

Now answer these questions:

1. Where does Lerato’s grandfather live?

_____

_____.

2. How many times a month does Lerato’s grandfather visit Lerato and her family?

_____

_____.

3. What is Lerato’s favourite dinner?

_____

_____.

4. What does Lerato’s mom cook together with the chicken?

_____

_____.

5. Who cooks the best fried chicken in Lerato’s family?

_____.

6. How many children are there in Lerato’s family?

_____

_____.

7. What story did Lerato tell her grandfather?

_____

_____

_____.

8. How much did Lerato’s grandfather like her story?

_____

_____.

9. What does Lerato’s grandfather teach Lerato and her mom to make?

_____

_____.

10. How does the food that Lerato and her mom cook taste?

_____

_____.