THE CONTRIBUTION OF PHONOLOGICAL AND MORPHOLOGICAL AWARENESS TO WORD READING ABILITY IN L1 HINDI/L2 ENGLISH BILINGUAL CHILDREN: WITHIN-LANGUAGE AND CROSS-LANGUAGE INFLUENCES FROM L1 TO L2

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The material presented in this thesis is the original work of the candidate, except as acknowledged in the document, and has not been previously submitted to this or any other university for a degree, either in part or in full.

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This PhD phase of life has taught me valuable lessons in life that have transformed my vision towards life. I understand now that the knowledge I have acquired is just a drop of water in the vast ocean, and that I should never stop learning. I realise, too, that no matter how skilled you are, learn to be modest and share with others the knowledge you have. Be patient in facing the obstacles in life in your search to acquire it and never lose hope when you focus on a clear goal.

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ABSTRACT

The ability to read materials, such as textbooks, is vital to achieve academic success in education. In many cases, such as the one considered in this thesis (that of India), this may require the acquisition of reading in a second language as well as first-language reading. Due to its complexity, the reading process is a challenge for children. Morphological awareness and phonological awareness are the cognitive-linguistic predictors that have been argued to address this complexity. In constructing meaning from written text, morphological knowledge can provide useful information about word structure and syntactic meaning. The knowledge on the construction of sound in the word is provided by phonological awareness. Both skills, independent of other reading-related skills, such as vocabulary, have been argued to facilitate reading competence. The study reported in this thesis considered the impact of morphological and phonological awareness on the ability to read Hindi (L1) and English (L2) words in the early years of learning these literacy skills. It also investigated the potential for morphological and phonological awareness to transfer from Hindi to English in support of word reading.

A series of pilot studies were implemented to develop Hindi and English measures appropriate for the present research context. These were then given to 213 children from KG to grade 3 in preschool and primary schools within the Delhi region of India, where Hindi was typically the first language of the children and English the second. The measures comprised a single word reading measure, three morphological awareness measures, five phonological awareness measures and a vocabulary measure in Hindi and English both languages.

The findings showed significant correlations between the phonology, morphology and vocabulary and the word reading measures in both Hindi and English. In addition, regression analyses indicated that morphological awareness was the largest predictor of variability in Hindi (first language) word reading ability, while phonological awareness was the larger for

English (second language) word reading ability. In both cases, variability was predicted after controlling for vocabulary. Regressions investigating cross-language influences indicated that measures of Hindi predicted small, but significant, levels of variability in English word reading over-and-above the level of prediction provided by the English measures.

The findings suggest that phonological and morphological awareness both contribute to Hindi and English word reading, but that the main predictors vary across the two languages. They also provide some evidence for cross-language transfer of meta-linguistic awareness between Hindi and English. These observations have both theoretical and practical implications.

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Chapter 1 General Introduction

1.1 Introduction

This chapter provides a brief background for the research presented in the thesis. It includes an overview of the research context investigating the relationships between cognitive linguistic skills (phonological and morphological awareness) and word reading in first language (L1) Hindi and second language (L2) English, and the potential influence of L1 Hindi reading skills on L2 English reading ability.

1.2 Background to the Research

In order to access knowledge in everyday life, reading is important and plays a critical and complex role in social and working life Cain (2010). In several parts of the world, reading in more than one language has become prevalent. This is due to both the use of two or more languages and/or the rise of social bilingualism as a result of people's migration all-over the world, specifically to countries that speak English or are more developed. The English language has also become popular around the world, especially in education and commerce, as part of such processes and it has therefore been considered the second language worldwide (Meganathan, 2011). In multilingual settings, such as India, the growth of simultaneous reading and the ability to comprehend the written text in different languages is very prevalent for students. There are commonalities in the mechanisms for acquiring biliteracy, which necessitates analysis of the learning to read in their primary language, and other languages that children are expected to learn in a particular educational setting. In the past few decades, reading research literature has discussed biliteracy (Archibald et al., 2006; Leikin et al., 2010; Schwartz et al., 2008; Zhang & Koda, 2017). The current research is an attempt to educate the

field within the bilingual framework of the Delhi region in India among Hindi-English bilingual children through identifying possible predictors of reading.

Koul (2019) reported that in the VIII Schedule, the Constitution of India identifies 22 languages out of the many languages spoken in India (for more information, see Chapter 3). The background for the current research program in Delhi with Hindi as the regional (first) language. Additionally, Hindi is also a first official language in India. This is taught in most schools as the first/primary language for education in Delhi, India. In addition to Hindi L1, children have to learn the English language L2 from their pre-schools in their daily schooling. Children in Delhi are prepared for language development in Kindergarten and start learning Hindi aksharas and the English alphabet by using the phonics method explicitly (i.e., teaching children to read by connecting sounds and symbols that represent them). The successful acquisition of literacy skills closely related to the resources available for reading.

Given that, it is useful to compare the reading process in these two linguistically different orthographies, provided that children in Delhi schools are expected to learn literacy skills in Hindi and English languages. Hindi is an alphasyllabic orthography, which resembles other Indian alphasyllabic orthographies and English is an alphabetic orthography. In contrast to the English language, which typically uses separate letters, Hindi uses a horizontal bar to connect a word's aksharas, which can help to differentiate between word boundaries. Upper and lower-case differences are used in English language, unlike Hindi (Daniels & Bright, 1996; Vaid & Gupta, 2002). In Hindi and English, consonant cluster rules also vary (variations and similarities of these two languages are addressed further in Chapter 3). Such variations and similarities are of concern because they can impact the way children learn to read Hindi L1 and English L2 in bilingual contexts.

By using the knowledge of linguistic constructs, one needs to decode words in the texts and understand the meaning of words from texts. It is a dynamic process with multiple components (Snow et al., 2002) this includes active correspondence between the reader and the text (Van Den Broek & Kremer, 2000). Recent research has focused on the nature and processes of both L1 and L2 learners' reading development (Carlisle, 2000; Choi, 2015; Diamanti et al., 2017; Gough & Tunmer, 1986; Nakamura & De Hoop, 2014; Saiegh-Haddad & Geva, 2008). In addition, due to the complex nature of the reading, study findings on the success of reading ability have provided a greater understanding of the difficulty of reading procedures involved in the growth of reading proficiency. Therefore, to predict future success in reading ability, there is a need to establish a sound understanding of decoding skills and linguistic comprehension abilities. In India, the ability to read a second language is an important and vital aspect that should carefully considered in the process of developing Hindi L1 and English L2 skills, as it will help students attain their desired educational achievements. In light of this rationale, the present research focuses on the aspect of literacy outcome that is, reading, in understanding the biliteracy development of young Hindi-English bilingual children (R. K. Mishra, 2019; N. Singh & Mishra, 2013).

The present research focuses on reading to inform our understanding of biliteracy development of young Hindi (L1) speaking English (L2) language learners. Understanding of biliteracy development first requires a knowledge of reading processes in each of the two languages under acquisition. From a psycholinguistic perspective, biliteracy development among young children can be understood by two sources of influence. One concerns the processes involved in learning each of the two languages. The other involves an interaction between the learning of the two languages. The observation of cross-language relationships between L1 and L2 learners also captures such interaction: i.e., a skill in one language is associated to the corresponding skill in another.

Universal behaviours of mapping written symbols to oral language are involved in reading mechanism across various languages, although different writing systems use different sets of principles to define the necessary units and their relationships to language units (Çapan & Pektas, 2013). The present research focuses on understanding whether there are similar or different cognitive demands in acquiring word reading skills in Hindi L1 and English L2 among bilingual children.

Literacy development theories generally describe two metalinguistic abilities that lead to reading and spelling acquisition: morphological awareness and phonological knowledge (Anderson & Freebody, 1981; Bear & Templeton, 1998; D'Angiulli, Siegel, & Serra, 2001; Diamanti et al., 2017; Ehri & McCormick, 1998; Fracasso, Bangs, & Binder, 2016; Siegler, 1998). While hypotheses differ as to whether these skills gradually or concurrently lead to the development of literacy, there is general agreement that knowledge of sounds and meanings are vital components to the development of literacy abilities. In addition to these linguistic abilities, researchers have also shown that other linguistic and processing abilities such as vocabulary knowledge affect the development of reading skills (P. G. Bowers & Wolf, 1993; Nation & Snowling, 2004). Therefore, the present research aims to control the effects of vocabulary knowledge, operating as a control variable.

1.3 Influence of phonological and morphological skills within language processes

Phonological awareness has been defined as one's awareness of the sound construction of word, and is a cognitive-linguistic ability that has shown to be related to reading acquisition (Hulme et al., 2002). Alongside, morphological awareness is an important cognitive skill which involves the individual's conscious awareness with the ability to manipulate the morphological

units (Carlisle, 1995). Existing reading research studies have identified the significance of phonological and morphological awareness in facilitating reading ability among children see, for example, (Clarke, 1988; Diamanti et al., 2017; Gough & Tunmer, 1986; Ku & Anderson, 2003; Saiegh-Haddad & Geva, 2008; Singson, Mahony, & Mann, 2000). However, only a few studies have focused on children's Hindi phonological and morphological awareness and word-reading skills or endeavoured to determine whether these skills differentially influence Hindi L1 word reading competence and English L2 word reading competence (Chatterjee, Kar, & Awasthy, 2014; Kandhadai & Sproat, 2010; Mirza & Gottardo, 2019; R. K. Mishra, 2019). Hence, it can be argued that the awareness of phonemes and morphemes may be useful to readers with additional knowledge of the reading processes they are learning (Hulme et al., 2002). As mentioned phonemic and morphological awareness help children understand other linguistic factors independent of vocabulary. As such, instruction in these two abilities has been identified as facilitative in supporting learners' reading skills in L1 and L2 (Carlisle & Nomanbhoy, 1993; R. Mishra & Stainthorp, 2007; Nag & Snowling, 2012; Nakamura & De Hoop, 2014; Wade-Woolley & Geva, 1999). Although, researchers have examined the individual contributions of these linguistic and processing skills to the reading ability, just a few have simultaneously examine these linguistic skills, with or without other linguistic or processing variables (Apel, Wilson-Fowler, Brimo, & Perrin, 2012). There are many advantages of evaluating possible fundamental skills concurrently, not least of which is assessing whether the skills separately contribute to the development of literacy. A better understanding of reading progress will be achieved by identifying certain skills that relate specifically to reading proficiency and, hopefully, instructional practices will be informed and refined. The objective of this research was to establish whether, together with other established contributing skill (i.e. vocabulary), the two linguistic skills (phonological and morphological awareness) recognised as predictors to the reading ability, uniquely contribute to success on a

word level reading measure when tested simultaneously. In other words, we have examined the independent contributions of phonological awareness, morphological awareness processing to word level reading in both of these languages. Additionally, this present study aims to promote the development of such knowledge by exploring the relationship between phonological and morphological awareness and reading of words among first-language Hindi learners who are learning English as a second language. Research on developing the language skills and reading progress of these students is difficult to locate.

It has also been proposed in the literature that, in addition to reading processes, morphological and phonological awareness are linked to vocabulary knowledge (Anderson & Freebody, 1981; Anglin, Miller, & Wakefield, 1993; Apel et al., 2012) and the vocabulary is related with reading ability (Carlisle & Nomanbhoy, 1993; Nagy, Berninger, & Abbott, 2006). It can therefore be argued that morphological awareness and phonological awareness via vocabulary knowledge can contribute to word reading. In this research, the emphasis was on the contributions to word level reading of phonological awareness and morphological awareness processing while regulating knowledge of vocabulary (for further information of this heading see chapter 2).

1.4 Cross-Language Transfer

Language transfer generally referred to as the cross-linguistic impact in which the second language of a person is impacted by the first language (Jarvis & Pavlenko, 2008). The phenomenon of one language in a single mind influencing another language known as cross-linguistic influence/transfer. Over the years, the study of second language learning has developed in several ways. The learning of a second language is a multidimensional phenomenon, and different people have different opinions on it (Ellis, 2003). To understand language transfer, it is important to examine the key features of L1 first. In early childhood (before or about the age of three), children are assumed to acquire L1 through society, whereas

in general, L2 is either an official and socially developed language primarily needed for education and jobs (Saville-Troike, 2006). Any number of languages that a person may achieve must be more or less intermingled with each other rather than individually processed, for example, L1 skill can affect L2 learning (Cook, 2018). Koda (2007) clarified that immersion in two languages results in a positive relation between them, although according to the differing demands of those languages, continuous improvement takes place in each language. The current research on Hindi L1-English L2 readers in the Hindi-English bi-literacy setting has the potential to provide more understanding on the relationships between the skills in the two languages.

1.4.1 Transfer of Phonological and morphological skill from L1 to L2

Many research studies have focused on the development of two primary features - phonological and morphological awareness in L1 and how these uniquely contribute to L2. A study with L1 Spanish and L2 English first-grade bilinguals illustrates that L1 phonemic knowledge is helpful in decoding performance in L2, and transfers in a cross-linguistic way from L1 to L2 (Durgunoğlu, Nagy, & Hancin-Bhatt, 1993). Phonological awareness appears to be a powerful predictor of word reading in both proficient, within and across languages (Hulme et al., 2002). To assess word reading and phonological abilities to understand the extent of phonemic understanding, they also tested the performance of 5 and 6 years old children. Other researchers report that, the skill of phonological awareness seem to be transferred across opaque and transparent languages at the syllable and phoneme levels (Cárdenas-Hagan, Carlson, & Pollard-Durodola, 2007; Nakamura, Koda, & Joshi, 2014; Sparks, Patton, Ganschow, Humbach, & Javorsky, 2008; Verhoeven, 2007).

Previous research of two different orthographies has shown that individual differences in phonological awareness predict variance in word level reading skills longitudinally (Nakamura

et al., 2014). These researchers also found, the prediction of phonological awareness of alphasyllabic orthography to alphabetic reading survives after nonverbal intelligence, memory, and visual skills are statistically controlled and even sustained over time (Nakamura et al., 2014).

Many studies identified that reading variance in L1 and L2 is significantly predicted by morphological awareness (Jeon, 2011; Jeon & Yamashita, 2014; Ku & Anderson, 2003; Nagy et al., 2006). Preschool children have been reported as being capable of recognizing morphemes with inflections and derivations (Carlisle, 2003). Preschool children are the participants in the current research and may have some morphological knowledge. When learning word meanings, knowledge of morphological aspects will help bilingual children develop and expand their language skills and vocabulary knowledge (Droop & Verhoeven, 2003; Ku & Anderson, 2003). For instance, if the root word is *help* and the words made from *help* are *helpful, helpless, helping*, and *helper*, if children have knowledge of root words and morphological units added with these words, then it can not only enhance reading ability, but also increase their knowledge of vocabulary.

Wang, Ko, and Choi (2009) provided evidence that the Korean L1 morphological awareness is an important skill to predict reading ability in L2 English. The extant findings indicate that morphological awareness plays a key role in the development of language and literacy. Hence, appropriate knowledge of phonological and morphological abilities may further enhance the reading ability of a learner. These existing theoretical perspectives of the transfer of phonological processing and morphological knowledge within and across languages provide insight into the focus of the current study (see detailed explanation of this point in chapter 2).

1.5 Statement of the Problem

Studies have shown evidence that transfer between two languages, specifically morphological and phonological awareness, is generally positive (M. Harris & Hatano, 1999). Phonological and morphological tasks require children to control their attention in the process, which is beneficial to understand two competing language structures (Bialystok, 2009). In bilingual settings, like in India, the ability to read two languages is popular in schools. Techniques for the acquisition of language transfer need to improve in this bilingual setting, a situation that demands a study of learning to read in the various languages that children are required to learn in a particular educational setting. This study also aims to address the acquisition of language transfer from L1 to L2.

English has become an important international language (Crystal, 2003; Kachru, Kachru, & Nelson, 2006) providing a way for people to exchange their thoughts and needs from different language backgrounds worldwide. Presently, in many countries like India, English is a compulsory subject in all educational institutions from early childhood centres to tertiary level in universities. Therefore, for success in education and career, acquiring English reading and writing skills are important. In India, Hindi is the national language and English is taught as an important additional language. As stated above, English was granted 'associate official language' status during the formative years of India's independence (Meganathan, 2011). The National Council of Educational Research and Training (NCERT) in 2006, when referring to the National Curriculum Framework (NCF, 2005), mentioned that a majority of parents of all classes would like their children to know English, since it is seen as the way to professional development and as a need in today's world. Despite the significance of English in India, pre-primary and primary school children face difficulties as they have to learn two languages at the same time in the initial stages of schooling. In India, therefore, the second language reading

system is a critical field that should be considered for the growth of English skills, as it will help children achieve their desired educational objectives.

Further, a report presented by Facilitating Reading Acquisition in Multilingual Environment in India (FRAME-India), referring to a research study conducted by the American Institutes for Research (AIR) in 2014, indicated that young children faced challenges when acquiring two or more languages (Nakamura & De Hoop, 2014). Similarly, Chatterjee and colleagues (Chatterjee et al., 2014) found that reading accuracy was better in Hindi as compared to English among Hindi-English bilingual children. Most children face problems in reading English words (Gupta & Jamal, 2007). A number of studies (Durgunoğlu et al., 1993; Durgunoğlu, Peynircioğlu, & Mir, 2002; Geva, Wade-Woolley, & Shany, 1997; Nakamura et al., 2014; Sun-Alperin & Wang, 2011) have focused among young bilinguals on language transfer from one language to another. Existing research literature, however, has proposed more research on language transfer across two comparable or distinct orthographies. In view of the rationale given, the objective of the current study is to investigate within language influence of morphological and phonological skills (L1 English and L2 Hindi) and transfer of these skills from L1 to L2.

1.6 Significance of the present study

The current research focuses on word reading among children in kindergarten and primary school. For continued achievement in educational settings, progress at kindergarten and primary school levels is crucial. In the language learning and teaching process, there are a variety of factors that can be considered, however the current study emphasizes on word reading because it is so critical for success in initial levels of educational contexts. Carrell, Devine, and Eskey (1988) noted that the reading ability is prevalent in L2 learning process for educational purposes, including sufficient use of academic content in teaching/learning

L2 English. This research explores the relationship between morphological awareness, phonological awareness, and word reading, and the cross-linguistic contribution of phonological and morphological awareness to word reading from Hindi L1 to English L2 among young bilinguals. In order to enhance L2 reading, the positive relationship between these linguistic abilities and strategies in language development can be considered beneficial. For example, if L1's phonological and morphological abilities seem to predict the variability in the reading of L2, then this study may be helpful in developing strategies for reading L2. In India and other countries where English as an L2 is used both in education and trade, the data can therefore be useful.

1.7 Summary and thesis aims

The intention of this study is to inspect the morphological and phonological awareness within and across languages (L1 and L2) in word reading proficiency. Language is an important element in the progress of the cognitive system that is essential for reading (Seymour, 2005). While phonological skills are essential for developing the representations of words in the mental lexicon and hence reading development, morphological knowledge helps the understanding of complex words by simplifying them and forming them into simpler units for better comprehension. Additionally, it is important to control the effects of vocabulary when investigating children's phonological and morphological awareness and reading ability within and across languages (L1 and L2).

Both skills (morphological and phonological awareness) have been found to contribute significantly to the reading ability in alphasyllabic orthography (Gafoor, 2013). In addition, studies separately argue that the major contributors to word reading in L1 alphasyllabic and L2 alphabetic orthography are either phonological (Nag & Snowling, 2012; Nakamura et al., 2014) or morphological knowledge (Gafoor, 2013). Given the contribution of phonological

knowledge to word reading on the one hand (R. Mishra & Stainthorp, 2007; Nag & Snowling, 2012; Nakamura et al., 2014) and that of morphological awareness to word reading (Gafoor, 2013) on the other, the studies did not provide sufficient evidence to establish whether morphological awareness and phonological awareness simultaneously contribute to the ability to read. As a result, it is unclear whether morphological awareness and phonological awareness will contribute to the ability to read in L1 and L2 concurrently or uniquely, through the mediation of vocabulary knowledge, and whether Hindi L1 and English L2 word reading are linked to phonological and morphological awareness. However, researchers have attempted to identify the issue of reading difficulty based on morphological awareness and phonological awareness, no concrete evidence seems to be available to determine any unique contribution of morphological awareness to Hindi (alphasyllabic) reading among L1 and L2 learners. The present research therefore aims to investigate whether phonological and morphological awareness in L1 Hindi alphasyllabic and L2 English alphabetic languages simultaneously or uniquely contributes to word reading. In order to provide a better understanding of the relationship between phonological awareness and morphological awareness and alphasyllabic and alphabetic word reading, it is important to untangle relationships within and across two distinct orthographies.

The researchers have proposed that the two distinct orthographies used for language learning need to incorporate two different levels of phonological and morphological awareness (Cárdenas-Hagan et al., 2007; Kuo & Anderson, 2012; Marinova-Todd, Siegel, & Mazabel, 2013; Nakamura et al., 2014; Sparks et al., 2008; Verhoeven, 2007). In comparison, between different aspects of metalinguistic knowledge, the transfer of phonological and morphological awareness has received relatively less attention at the same time, and only the few studies have examined the transfer of phonological and morphological awareness together (Gafoor, 2013; Diamanti et al., 2017; Apel et al., 2011; Deacon & Kirby, 2004).

However, further research needs to be done to test the extent to which, if any, morphological and phonological awareness transfer occurs across typologically different languages (Apel et al., 2012; Diamanti et al., 2017; Goodrich, Lonigan, & Farver, 2017; Jarvis & Pavlenko, 2008; Wang et al., 2009). While extensive detailed researches have provided the growing evidence relating to the cross-language transfer of phonological awareness and morphological knowledge between the various L1 languages and English, especially as L2, no concrete evidence has provided to ascertain the transfer between Hindi L1 alphasyllabic and English L2 alphabetic.

Overall, it remains to be consider if there are connections found between morphological awareness and phonological awareness and reading capacity in Hindi-speaking English language learners within and across languages. This thesis explores how phonological and morphological awareness contribute to word reading ability after vocabulary control in the L1 Hindi and L2 English among preschool and primary school bilingual students in Indian (Delhi region) schools. In addition, this study explores whether morphological awareness and phonological awareness among these children transfers between the L1 Hindi and L2 English in word reading proficiency.

In this bilingual Hindi-speaking English language learners' study, readers were recruited from Kindergarten to Grade 3, Kindergarten students and Grade 1 students were less skilled, while Grade 2 and 3 students can be thought of as relatively more skilled readers. In this investigation, the study conducted in a cross-sectional design. The purpose of this study is to track the effects of morphological and phonological skills on how they associated with reading ability across selected grade children (both within the languages and across languages).

The present study aims to answer the following questions:

(i) What is the relation between phonological and morphological awareness with L1 Hindi word reading and L2 English word reading?

(ii) Are phonological and morphological awareness predictors of Hindi L1 and English L2 word reading, controlling for vocabulary levels in the languages?

(iii) Is there evidence for morphological and phonological skills transferring from Hindi L1 to English L2?

1.8 Thesis Structure

This thesis comprises six chapters. Below is the summary of the chapters following this introduction chapter 1.

Chapter 2: To postulate a theoretical framework for the current study, Chapter 2 Literature Review presents relevant established hypotheses of reading skills derived from literature. This chapter discusses possible connections between awareness of phonology and morphology and word reading. Furthermore, this chapter presents evidence from the related literature concerning the influence of the first language L1 to the second language L2.

Chapter 3: This chapter focuses on the Hindi language's orthographical, phonological, and morphological knowledge. Additionally, this chapter explore the similarities and differences in Hindi L1 and English L2.

Chapter 4: Pilot tests for developing assessment measures are discussed in this chapter. The assessment tools, which consists eight tests in L1 Hindi and eight in L2 English, discussed in terms of reliability and validity of the tests. Example of items for each measure are given in order to understand the measures used in this study.

Chapter 5: This chapter first provides the details of the participants, materials, and procedures used for the main data collection then results and statistical analyses for answering the research questions.

Chapter 6. Finally, this chapter discuss the results, which then brings attention to the outcomes, directions for future studies, the limitations of this study and the conclusion.

Chapter 2 Literature Review

2.1 Introduction

The primary objective of reading is surely to consider the mere recognition of words and sentences excels (Nation, 2005; Paris, Hamilton, Israel, & Duffy, 2009). Understanding the process of learning to read helps researchers to understand how learning occurs, and information is processed among those learning to read. Traditional theories consider reading to have two key components: decoding and comprehension. Whereas decoding focuses on analysing individual words, comprehension is concerned with understanding the meaning derived from the decoded words in phrases, sentences, and paragraphs. A regular prerequisite in education and commerce is the ability to decipher the written word and gain meaning from written language. To construct meaning from the texts, readers are required to process words. By using the understanding of linguistic constructs, they need to interpret words in the texts to get the meaning from texts. Nevertheless, awareness is not limited to identifying words and sentences. It is a dynamic process with multiple components (Snow et al., 2002) that requires active interactions between the reader and the text (Van Den Broek & Krenaer, 2000). It is a cognitive process or deliberate practice (Lee, Moreno, Park, Carello, & Turvey, 2006) in which the reader associates with the text (T. L. E. Harris & Hodges, 1995) and manages his/her awareness of linguistic capabilities (i.e. phonological, morphological, syntactic, semantic, grammatical and vocabulary knowledge, etc.). The research done on the nature of reading, has led to the development of several contrasting theories on which mechanisms best work for teaching individuals to read. Learning to read, where an individual can effectively decode the words and understand their meaning and link this to the meaning of words around the decoded word, is probably the most basic requirement for human flourishing.

Literacy not only unlocks education and employment opportunities, but also enables a plethora of social and cultural benefits, enabling a richer, more fulfilling life.

Consequently, due to the complex nature of learning to read, bilingual readers have difficulties in extracting meaning from the text. Researchers (Carlisle, 2000; Choi, 2015; Clarke, 1988; Gough & Tunmer, 1986; Kirby et al., 2012; Saiegh-Haddad & Geva, 2008) have empirical evidence and understanding of the reading development processes of L1 learners and L2 learners. Existing research literature indicates various abilities that account for the reading process, such as morphological abilities, phonological abilities, orthographic ability, fluency ability, memory processing and vocabulary, etc. Among these many skills involved in the decoding process, phonological and morphological have been reported in L1 and L2 word reading ability (Berninger, Abbott, Nagy, & Carlisle, 2010; Diamanti et al., 2017; Durgunoğlu et al., 1993; Nakamura et al., 2014).

Since the simultaneous relationship between phonological awareness, morphological awareness, and word reading in language and across languages has not been adequately researched: L1 Hindi and L2 English, the present study explicitly aims to examine the influence of such relationships in L1 and L2 reading process. The literature supporting the research discussed in this study is covered in this chapter. Next, the hypotheses of the reading processes explored, that provide some insight on how researchers work with reading difficulty and provide a deeper understanding of the mechanisms involved in reading ability. In its exploration of the literature around learning to read, this chapter begins by considering the key theories for word recognition. For additional context, the chapter then discusses phonological and morphological awareness. Phonemes and morphemes show how words are recognised and lodge in the minds of young readers. Having considered the theoretical perspectives for reading

words, the chapter then, explores and discusses the linguistic skills, including phonological and morphological awareness, that are required for word reading.

2.2 Foundational theories for word recognition

The developmental theory of word recognition has an extensive literature (examples given in below sections of this chapter). Despite the rich variety of theories, in the literature on beginning reading, the developmental theory of word recognition that has been thoroughly explored is Frith (1985) three-stage theory. This theory suggests that before becoming a proficient reader, a child goes through three learning stages: the logographic phase, the alphabetic phase, and the orthographic phase. Words are recognised at the logographic stage based on the most prominent visual signs of the words. By translating the component letters to their related sounds and combining those sounds to attain the pronunciation, words are recognized at the alphabetic stage (Cetin & Bay, 2015). At the orthographic stage, words automatically recognized without the mediation of the letter-sound conversion method by identifying the orthographic patterns. Ehri (1995), although argued for four stages of reading development, suggested a more recent stage theory of word recognition. Ehri introduced another stage between Frith's logographic and the alphabetic stage, that is, a partial alphabetic stage. Children use partial phonetic symbols to identify words at this stage. Some children, for example, use the name of a letter to read a word, for example, reading beat by merging the first letter name, b, and last letter name, t. These theories argues that the reader learns these skills in a sequential and linear way. The reader learns pre-reading abilities first, and then decoding abilities (Paris et al., 2009).

2.3 Theoretical views for Word Reading

Word recognition is one aspect of learning to read. Kendeou and O'Brien (2018) asserted that reading inculcates the integration and execution of many processes that leads to complexity. Reading is beyond the understanding of the underlying meaning of a word but also the comprehension of a complete word. For this, an individual must read the words and visually process them, detect and understand their phonological, orthographic, morphological representations, and further identify how to connect the words based on the rules of syntax so that the words are understood, along with the underlying meaning of the sentence within which they are located. Kendeou and O'Brien further observed that there is a higher-level process of comprehension that includes the reader characteristics and text properties. These affect the comprehension of simple text and synthesis and evaluation of information across texts.

The initial ideologies on word reading have been predominantly defined by knowledge-based models guided by scripts (Shank & Abelson, 1977) and different types of schemas (Anderson, 1978). Kintsch (1988) extended the research in this domain by building theories on text knowledge interaction. The most prominent theories of reading or understanding the nature of learning to read are traditional, cognitive, and metacognitive theories. While the traditional view emphasizes the printed form of text, the cognitive view focuses instead on the reader's underlying knowledge of the printed text. The metacognitive view relates to the reader's thinking approaches towards reading and comprehending words. The last is, at least in part, dependent on the strategic control of the reader during reading processes. This section explores the aforementioned theories to evolve a deeper understanding of word reading and comprehension.

2.3.1 The traditional view (bottom-up)

Parlindungan (2010) argued that traditional theories of word reading are conditional on phonics, according to which a learner (or beginning reader) must be capable of associating letters with sounds in a sequential manner. Reading is seen as a linear process where words are decoded in an orderly manner, and linked together to form phrases and sentences. Text is processed through the smallest sound units, which then merge to form words. However, according to Omaggio (1993), such a traditional view was more reliant on behaviourist psychology. Within this framework, learning to read relies on regular learning habits, such as drilling and error correction. Samuels and Kamil (1988) argued that such a behaviourist psychology perspective only considers reading as including word recognition responses towards the printed form, and lacks insight into the thought processes of the reader on how to make sense of the text. Stanovich (1980) determined that the traditional or bottom-up theory/model provides the means to understand information flow as a process that includes stages, where the output of one stage serves as an input to the next stage which does not affect the earlier stages. Anderson (2019) argued that true comprehension includes the understanding of the meaning of words. Anderson further pointed out that readers would initially require sub-skills of processing information (skills involved in reading processes) to ultimately build reading proficiency.

The traditional view offers a theoretical base to which considerable other reading literature refers. It proposes written language can be considered as a code where the learner must detect graphemes and transform them into phonemes, and understand the meaning existing in the text (Stanovich, 1980). On the other hand, Parlindungan (2010) claimed that the traditional model is insufficient for understanding the nature of learning to read as it is highly dependent on

words and structure alone that form the formal features of a language, while these are necessary elements in providing the background knowledge of readers.

2.3.2 The cognitive view (top-down)

The distinctive capacity of the human mind to learn has given rise to a more cognitive explanation of learning to read (Omaggio, 1993). Derewianka and Jones (2016) identified a stark difference between meaningful learning and rote learning that corresponds to memorisation technique based on repetition and drilling. While rote learning enables the reader to simply memorise single words, their meanings, and the rules of a new language, meaningful learning enables the comprehension of words by processing information in a relevant context and relating it to one's existing cognitive structure (Omaggio, 1993). As asserted by Smith (1994) , learning without meaningful instances rarely becomes permanent. As a result, learning that includes the experiences and knowledge of the learner will both influence reading comprehension and, potentially word reading. A shift from a traditional view to a cognitive view symbolizes the significant change in understanding how students learn to read. Tierney and Pearson (1981) provided an understanding to the cognitive view by postulating that such a model encourages the use of knowledge to extract the meaning from a word and text, as well as to process the information depicted through the text. The creation of meaning is reliant on the background knowledge and active cognition of the reader. Smith (1994) added that reading cannot be considered as a mechanical and meaningless activity that only decodes printed text to sound. It is rational and purposeful, and depends on the previous knowledge and expectations of the learner.

2.3.3 The schema theory

The schema theory, which is associated with the type of cognitive theories discussed above, emphasizes reading instruction. Readers must use their background knowledge to interact with the reading activity and decipher the text (Derewianka & Jones, 2016). As specified by Smith (1994), the schema theory views past experiences as integral aspects that develop mental frameworks for a reader, assisting further in the creation of new experiences. Kucer (1987) proposed that past experiences include objects and events that form our knowledge, and that this knowledge can be retrieved to process new information and interpret it to form valuable meanings. Anderson (2019) elaborated upon this theory through his research, positing that a reader is better able to understand the meaning of words when they can recall the schema that describes the object or event related to the text. Comprehension is closely tied with creating a schema that is well able to provide explanation and clarity on the events or objects mentioned in the printed text. Anderson and Pearson (1988) furthered this thought by adding that comprehension enables the association and interaction between previously gained and new information. Reading signifies that the reader has developed a mental framework for the text or modified an existing mental image so as to remember the new text. As per the schema view, a reader reconstructs the schemata to include more information (Harmer, 2007, 2008).

2.3.4 The metacognitive theory

Apart from the role played by one's knowledge and experience on reading ability, Block (1993) asserted that readers have control over the way with which they understand the text and information associated with it. Metacognition deals with the activities executed by a reader while reading. The reader processes the text in different stages: before reading, while reading, and after reading. Before reading, the reader identifies the objective behind reading, and the form of text that they are exploring. During reading, the characteristics of the text are evaluated

by the reader. The reader considers the topics covered in the text, the additional details required to derive a conclusion, and predicts what information will be required based on the previously read text. After reading, the reader can draw conclusions and inferences on what has been read.

Van Kraayenoord (2010) provided another perspective on metacognition as a key aspect that highlighted the learners' reflective process on how they gain understanding and apply self-regulation throughout the process of learning to read. Metacognition refers to knowledge and regulation of cognition. Flavell (1979) stated that while knowledge about cognition inculcates the knowledge about self and the task to be executed, along with the strategy to be used to execute the task, regulation of cognition refers to the actions performed by the learner to gain expertise in an area and achieve the overall goals in learning. According to Dunlosky and Metcalfe (2008), metacognitive theory consists of two entities, where one is metacognitive monitoring and the other is metacognitive control. While metacognitive theory corresponds to the evaluation of the current cognitive activity of an individual, metacognitive control relates to the regulation of the same activity that may include planning, evaluating, revising and recalling mechanisms.

A study by Perfetti and Stafura (2014) developed a framework for understanding word knowledge and word-to-text integration that can facilitate the overall comprehension process of the learners. The researchers emphasized the crucial role of the word identification system and the comprehension system and offered insights into the reading processes that are crucial for these purposes. The processes were concerned with rapid lexical access dependent on the word form, activation of knowledge from the reader's memory, access to the memory of recently comprehended text, and knowledge on the meaning associated with the text. These processes together assist in word-to-text integration and overall comprehension.

2.4 Developing cognitive-linguistic Skills

Learning to read is an essential skill required to fulfil basic communication tasks, but not all children can learn sufficiently (Genlott & Grönlund, 2013). According to Gilakjani and Sabouri (2016), reading ability can be enhanced with the use of effective reading strategies. Teachers can use a variety of class activities, which help children to learn about the structure of their first language. Children cannot be expected to consciously know how their first language is constructed. Rather, according to Küçükoğlu (2013), reading strategies and skills must be taught to the students. Łockiewicz and Jaskulska (2019) observed that students who were aware of the linguistic structure of their first language tended to learn second languages more easily. Better understanding of a first language might lead to the effective reading ability of both first and second language.

Duncan (2018) found that meta-linguistic awareness was affected by the mutual involvement of phonemes and morphemes, and such relationships may be influenced by the differences that emerge due to the spoken and written forms of two or more languages. Daffern (2017) pointed out that word-formation process requires linguistic skills, where phonological and morphological components in the language play a prominent role in learning to read and spell. Similarly, Engen and Høien (2002) observed that such linguistic skills are prerequisites for learning how to read and understanding the meanings of words and sentences.

The primary function of reading is to gain meaning from text. Reading is a language-based process, where sounds and meanings are connected in the minds of readers, aiding recognition. For this reason, scholarly understandings of word recognition are enriched through the understanding of these units of sound and meaning: phonemes and morphemes. Word recognition, phonological and morphological awareness are all important parts of learning to read. None of these skills, however, can be used in isolation; all these skills should be used in

the language-learning process. The section below discusses investigation into the relationship between linguistic skills (morphological and phonological awareness) in learning to read.

2.4.1 Phonological and Morphological Awareness and Reading Ability

This study presents an attempt to confirm the hypothesis that phonological and morphological knowledge is essential in achieving reading competence and that this is the case for readers learning in more than one language. In any language, *phonemes* are the smallest units of sound whereas *morphemes* are the smallest units of meaning. Additionally, sound and meaning are two features of an oral language system that are relevant to the written language system. It then makes sense to expect that awareness of sound structures (that is, phonological awareness) and units of meaning (that is, morphological awareness) would influence reading skills.

Numerous studies have tested on children, provided empirical evidence of the relationships between phonological and morphological awareness and their word reading proficiency in L1 see, for example (Casalis & Louis-Alexandre, 2000; Diamanti et al., 2017; Duncan, 2018; Kirby et al., 2012; Ku & Anderson, 2003; McNeill & Everatt, 2013; Saiegh-Haddad & Geva, 2008; Schiff & Saiegh-Haddad, 2018). Carlisle and Nomanbhoy (1993) also claim that phonological and morphological awareness both contribute to word reading. According to the findings from Berninger and colleagues (Berninger et al., 2010), the most significant development in phonological and morphological awareness occurs in the first three years of school. If beginning readers learning to read, we can logically conclude that phonological and morphological awareness are of critical importance when teaching bilingual children to read L1 and L2. By focusing on phonological and morphological awareness, children can coordinate these types of linguistic awareness with greater ease and success.

Deacon (2012) reported that phonological awareness and morphological awareness predicted variability in English L1 word reading but that phonological awareness was more associated with better word reading among the participating children up to Grade 3. Casalis and Louis-Alexandre (2000) studied early reading performance among French-speaking preschool children and found positive correlations between morphological awareness and phonological awareness and French L1 early reading ability. Researchers have also investigated phonological and morphological awareness through a number of age levels, from beginner readers to advanced readers. (Abu-Rabia, Shakkour, & Siegel, 2013; Carlisle, 2000; Carlisle & Nomanbhoy, 1993; Diamanti et al., 2017; Manolitsis, Grigorakis, & Georgiou, 2017; Nagy et al., 2006). For example, Diamanti et al. (2017), having examined the relationship among Kindergarten children while Schiff and Saiegh-Haddad (2018) investigated second to eighth graders' phonological awareness, morphological awareness and their reading ability, concluded that phonological and morphological awareness contributed uniquely to the reading ability at these levels. Further, Ku and Anderson (2003) also found that morphological awareness was a major predictor of reading abilities in students speaking Chinese L1 and English L2. The authors suggested that morphological awareness could also predict the ability to read non-alphabetic languages such as Chinese.

As demonstrated in studies by Richards and colleagues, phonological word forms (Tiffin-Richards, Hasselhorn, Woerner, Rothenberger, & Banaschewski, 2008) and morphological word forms (Richards et al., 2006) help to activate a child's brain in ways conducive to reading ability. However, only a few studies have concentrated on the phonological and morphological awareness of children and the ability to read words or have tried to establish whether these abilities affect Hindi L1 word reading and English L2 word reading differentially. The studies that do exist include ones by Chatterjee et al. (2014), Kandhadai and Sproat (2010), and Mirza

and Gottardo (2019). However, none of these authors reported using morphological awareness as one of the independent variable in predicting reading skill.

2.4.2 Within Language influence of Phonological Awareness

In learning to read non-alphabetic languages, the significance of phonological skills is less evident. Every symbol maps to a syllable in Chinese orthography, therefore there is no essential position for phoneme information in logographic literacy. However, studies have identified that phonological awareness analyses is required in Chinese reading process (D. Lin et al., 2010; Suk-Han Ho & Bryant, 1997) and that skilled and less-skilled readers vary in their assessments exploring both syllable and phonemic skills (McBride-Chang, Bialystok, Chong, & Li, 2004; Shu, Peng, & McBride-Chang, 2008). A limitation of such studies is that Chinese learners who participated, are taught an alphabetic language and the findings are less explicit about the acquisition of phonemic awareness in the Chinese language and also instruction does not provide reference to phonetic details (Huang & Hanley, 1995). The success in reading development involves the reader using grain sizes in their language symbol system (Ziegler & Goswami, 2005), a term used to describe that some orthographies have units that have big grain sizes, such as syllabaries which pack a lot of information into a single unit (for example, *akshara* in Hindi language) versus other systems with smaller grain sizes which represent each individual phoneme, operating within this "psycholinguistic grain size" context allows an efficient mapping of the phonology of their language. It appears that languages with mappings of more than one unit size to orthographic units (e.g. English single letters and letter sequences) provide the learner with more difficulties than orthographies containing only small or large units (e.g., Japanese Hiragana is commonly influenced by syllable-level elements; Finnish is commonly influenced by phoneme-level elements).

In alphabetic orthography, Deacon and Kirby (2004) conducted a longitudinal study and found that phonological awareness made significant contributions to English single word reading among English-speaking children in Grades 2 to 5. They also proposed that morphological awareness contributed to a small but independent effect of phonological awareness. Deacon (2012) assessed Grade 1 and Grade 3 children's reading skills within the English language and found that phonological awareness had a relatively large effect on word reading, while the influence of morphological awareness was relatively weak. Dyer (2016) argued that phonological awareness is extremely important for children who have English as their birth language. According to Dyer, learning phonemes is a highly effective supplement to traditional spelling lessons because it teaches systematic principles alongside traditional means of teaching spelling, which requires the spelling of each word to be learnt individually. If these findings are relevant to children who speak English as a birth tongue, then they are even more relevant to bilingual children learning English.

Del Campo, Buchanan, Abbott, and Berninger (2015) studied the relationship between the various stages or points of phonological processing and multi-level functional reading. Del Campo and colleagues found that phonological skills are highly associated with the literacy skills needed to decode for oral reading as they affect the pronunciation of the words, as well as support the accessing of their meaning and the understanding of the meaning of passages.

Acquiring a certain level of phonological awareness is highly crucial for facilitating reading proficiency (Tunmer & Hoover, 1992). Zadeh, Farnia, and Geva (2012) collected data from English language learners from different linguistics backgrounds. Interestingly, they found that word-level reading skills were enhanced through the mediating role of phonological awareness and reading ability. Furthermore, training in phonological awareness (Lundberg, 1994) can have a positive and beneficial impact on reading and those with poor reading skills have been

found to be weak in the phonological domain. Difficulties in phonological processing leads to poor reading ability as such difficulties hinder the development of automatic word decoding, essential for understanding the underlying meaning of the words. Engen and Høien (2002) reported that phonological awareness has a unique influence on reading and the processing of the text. Tunmer and Hoover (2019) also emphasized the need of acquiring phonemic awareness so as to facilitate the ability to read an alphabetic language. However, Hoover (2002) also professed that while knowledge of phonemes is necessary to learn a written language, yet, it is an unconscious process that requires an active linguistic environment.

Bentin and Leshem (1993) also observed this bidirectional relationship, stating that the association between phonemic awareness and learning to read indicates that the development of word reading skills improves the phonemic awareness of the reader. Melby-Lervåg and Lervåg (2011) studied the association between phonemic and rime awareness, short-term memory, and word reading skills. The reading skills of those with lower levels of phonological awareness were observed to be poorer than those with better levels of the same skill. Phonological awareness was also found to be the most significant factor in affecting word reading ability and reading development compared to rime awareness and verbal short-term memory. Furthermore, phonological awareness has a relevant and significant impact on word and text reading among the learners aiming to learn a second language (Duncan, 2018). Duncan and colleagues (Duncan et al., 2013) pointed out that explicit phoneme awareness is developed once there is the need to learn how to read.

Dyer (2016) work corroborates that of Lonigan (2007), who looked at the association between the phonological awareness and vocabulary knowledge of early grades children. The children who had developed strong phonological processing skills also had a strong understanding of how graphemes in written alphabetic languages connect to the phonemes in spoken language.

In contrast, the children who had not developed these skills, or had developed them to a lesser strength, struggled to connect written and spoken language. They instead relied on context and cues to learn vocabulary. Dyer describes this reliance as a lengthy, inefficient process and he does so in his work on learning to read in English. Helping children to develop better phonological processing skills would eliminate the need for such cumbersome methods. In addition, children equipped with a strong phonological awareness should be able to learn spelling patterns far more quickly than their less aware peers.

Furthermore, various studies in the relevant research literature also show links between phonological processing skills and vocabulary knowledge, in English (Avons, Wragg, Cupples, & Lovegrove, 1998; Gathercole, Service, Hitch, Adams, & Martin, 1999; Gathercole, Willis, Emslie, & Baddeley, 1992; Metsala, 1999). Consequently, it is likely that phonological awareness and vocabulary knowledge are similarly associated. Studies examining the relationship between vocabulary and phonological awareness skills have indicated that among children developing normatively, the two skills are indeed related (Lonigan et al., 2009; McDowell, Lonigan, & Goldstein, 2007; Whitehurst & Lonigan, 2001).

Further, extant literature also indicates that vocabulary development, or the process of restructuring one's lexicon (Metsala & Walley, 1998), may facilitate the emergence of phonemic awareness (McDowell, Lefever-Davis, Kear, & Hamm, 2006). As Chaney (1992, p. 512) observes, "the young child's success in solving metalinguistic problems is not so dependent on an ability to step back from meaning as on the state of linguistic knowledge of a particular linguistic structure". In general, the phonological awareness and vocabulary knowledge of children reflect the training of these core skills in study recommendations and expectations about early childhood training programs and expected performance (O'Leary, Cockburn, Powell, & Diamond, 2010). It seems that ability to discern phonemic differences

makes for easier mastery of English by bilingual children. Phonemes, for example, play a special role in how children learn vocabulary as they develop their word reading. This may be because phonemes provide a basic level of consistency not found in the spelling.

2.4.3 Within Language influence of Morphological Awareness

Morphological awareness, on the other hand, has received less attention as compared to phonological awareness partly due to its complex nature. In addition, the relative contribution of phonological awareness and morphological awareness has been an issue of debate. Morphological awareness and reading skills have found to be interrelated (T. L. Clark, 2017). There are several ways in which morphological awareness can expected to contribute to reading ability. Morphemes, in addition to being the smallest unit of meaning, also contain syntactic and phonological properties, which have the potential to influence reading.

English utilizes a morpho-phonemic system for mapping print to sound such that meaning is communicated through letters, sounds, and units of meaning. Changes in the spellings of different forms of words often based more on meaning or morphology than on sound or phonology. For example, the word *magician* is pronounced without the hard /c/ sound but spelled with the *c* because the meaning of the word is based on the root morpheme, *magic*. Similarly, the word pairs *peeled* and *field* and *kissed* and *list* sound similar but are spelled differently because only one word of the pair carries the meaning of *past tense* through the *ed* morpheme (Kang & Hwang, 2010).

Another reason to expect a relation between morphological awareness and decoding could be that pronunciation is often influenced by morphological rules. For example, morphological knowledge may facilitate the recognition of allomorphs (such as pronunciation of *sign* in *sign* and *signature*), leading to increased fluency and accuracy. Kendeou and O'Brien (2018)

asserted that reading process inculcates the integration and execution of many processes that leads to complexity. Comprehension is beyond the understanding of the underlying meaning of words but also the comprehension of a complete sentence. For this, an individual must read the words and visually process them, detect and understand their phonological and semantic representations, and further identify how to connect the words based on the rules of syntax so that the words are understood along with the underlying meaning of the sentence within which they are located.

However, Kirby and colleagues (Kirby et al., 2012) offered a different perspective on the topic stating that phoneme awareness is especially important in building morphemic awareness, particularly in cases where a lack of phonological transparency can lead to challenges in acquiring and performing morpheme awareness tasks. Deacon and Kirby (2004) reported that the influence of morphological awareness on reading development is above and beyond vocabulary.

In alphasyllabic orthography, Gafoor (2013) conducted a longitudinal study and examined morphological awareness, phonological awareness and non-verbal ability among two to four graders in their primary language (Malyalam) that is a south Indian language. He found that morphological awareness was a best predictor in Malyalam reading skills independent of phonological awareness. As, Carlisle (2003) proposed that morphological awareness could help children progressively master the several dynamic connections of morphology, phonology, and orthography to include in reading instruction at early stage. It might significantly affect reading skills (Berninger et al., 2010).

As per the insights drawn by Rastle (2019), morphology has a relevant and significant impact on reading acquisition. Other studies also reported morphological awareness assessments significantly related to literacy development (Apel & Lawrence, 2011; Carlisle, 1995, 2003;

Wolter, Wood, & D'Zatko, 2009). Additionally, study has linked morphological awareness to proficiency in the literacy skills of word reading, decoding, and reading comprehension (Carlisle & Nomanbhoy, 1993; Jarmulowicz, Hay, Taran, & Ethington, 2008; Wolter et al., 2009). Morphological awareness has been proposed as an effective way of recognizing students who are at risk of literacy failure. If it is possible to identify at-risk children in pre- and primary school, effective intervention may introduced to potentially discourage later grades from failing in literacy.

Although phonological awareness is such a well-known literacy predictor, the evidence that morphological awareness also contributes to early literacy development continues to grow (Deacon & Kirby, 2004; C. Kirk & Gillon, 2009; Wolter et al., 2009). Researchers also found that variability explained by morphological awareness, was accounted for single word reading scores among children in early grades (Carlisle & Nomanbhoy, 1993; Wolter et al., 2009). When emerging readers are aware of the suffixes and prefixes applied to the root words, they begin to see words with combinations of these constituent units and are therefore more able to decipher the meaning and pronunciation of unknown words (Green, 2009).

Furthermore, Diamanti and colleagues (Diamanti et al., 2017) reported that morphological awareness plays an essential role in Greek L1 word level reading success at a young age. Evidence from existing literature also indicates that morphological awareness improves with age (Carlisle, 2000; Nagy, Diakidoy, & Anderson, 1993). Children at the age three can generally create complex words to understand its meaning (Clark, 1995), and most children nearing school age are able to begin identifying morphemic units: inflections and derivations (Carlisle, 2003). Awareness of derived words by third graders increases sharply (Anglin et al., 1993).

In a longitudinal study, Cho, Chiu, and McBride-Chang (2011) stated that Korean children's morphological knowledge contributed to L1 reading ability via vocabulary. Further, Kirby and colleagues (Kirby et al., 2012) evaluated morphological awareness and reading among first to third graders. Their results indicated that word level reading significantly predicted by morphological awareness. These studies indicate that morphological awareness plays a vital role in word reading. Additionally, other studies have also found that, in addition to reading measures, morphological awareness is associated with vocabulary (Anglin et al., 1993; Nagy & Anderson, 1984; Ramirez, Walton, & Roberts, 2014; Verhoeven & Carlisle, 2006). As Nation (2001) pointed out, both skills share typical characteristics, among them word parts, meaning and use, and grammatical functions.

As learners acquire morphological skills, they becomes better equipped to decode unknown words , to recognise the meaningful units in words, such as prefixes, suffixes, and roots, and from there gain knowledge of vocabulary (Carlisle & Nomanbhoy, 1993; McBride-Chang et al., 2008; McBride–Chang, Wagner, Muse, Chow, & Shu, 2005; Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003; Shankweiler et al., 1995). McBride-Chang et al. (2008); McBride–Chang et al. (2005) provide insight into the connection between morphological awareness and vocabulary knowledge across different languages (Mandarin, Cantonese, Korean, and English). During their 2005 study, for example, the authors administered morphological awareness measures to English-speaking kindergarten children and first graders. Their results showed that morphological awareness predicted a particular proportion of the variance within the vocabulary competence of these young children, apart from other language-related skills such as phonological awareness. Since morphology has been linked to vocabulary and vocabulary predicts the ability to read, the current study also explores whether morphological awareness is linked to word reading through vocabulary knowledge. In this context, this research aims to provide correlational evidence within the regression analysis on

the relationship between morphological knowledge and word reading. The connections between morphological awareness and understanding of reading process assessed with statistical data.

2.5 Theories of Second language and Cross-Language Transfer in Word reading

Language transfer usually known as the cross-linguistic influence in which first language influencing a person's second language (Jarvis & Pavlenko, 2008). They also mention that if one language influences another language in an individual's brain then it known as cross-linguistic influence/transfer. Jarvis and Pavlenko propose several areas of cross-linguistic influence and investigate the mechanism of language transfer across languages. From a psycholinguistic perspective, bi-literacy development among young children can understood by two sources of influence. One concerns the processes involved in learning each of the two languages. The other involves an interaction between the learning of the two languages. The observation of cross-language relationships between L1 and L2 learners also captures such interaction: i.e., a skill in one language linked to the corresponding skill in another.

A child learns an L2 by the time they can learn essential skills of language learning, for example, basic awareness of phonemes and morphemes (Nair, 2013). Therefore, it may be important to emphasize such skills as having significant relations with the teaching of languages to bilingual children. In a study of cross-language transfer, Sun-Alperin and Wang (2011) reported that most of the children in their study had less L2 English expertise compared to their L1 Spanish, thus strengthening the skills of L1 may serve to develop L2 reading. Transfer can be either negative or positive i.e., when L1 knowledge is beneficial for the learner in using L2, it is called 'Positive Transfer', and if L2 expressions become difficult to understand

because of features of L1 knowledge, it is called 'Negative Transfer' (Yule, 2010). Additionally, many researchers have suggested that transfer within and across languages has pros and cons according to one's perspective and conclusion. Yule (2010) suggested that negative transfer is widespread in the early stages of learning L2, and that it decreases continuously as the learner becomes more familiar with the L2. Focusing on the transfer of languages among bilingual children in the early years of learning languages may therefore be important.

The investigation of transfer to second language learning, and related elements of teaching, can be dated back to the 1940s (Caravolas & Landerl, 2010). Its initial focus was on L2 acquisition of linguistic structures, such as phonology and grammar (Yesil-Dagli, 2011). Recently, attention has been drawn to the role of transfer in supporting the development of reading among second language learners or bilingual learners. However, transfer may be likely between similar languages, and less is known about how skills transfer between typologically different orthographies, like Hindi and English.

2.5.1 Transfer of phonological awareness from L1 to L2

Cross-cultural studies with parallel designs further suggested the role of phonological awareness in initial reading development across alphabetic and non-alphabetic languages (Goodrich et al., 2017). The prediction of phonological awareness of alphasyllabic orthography to alphabetic reading survives and is even sustained over time, after nonverbal intelligence, memory, and visual skills are statistically controlled (Nakamura et al., 2014). The skill of phonological awareness seem to be transferred across opaque and transparent languages at the syllable and phoneme levels (Cárdenas-Hagan et al., 2007; Nakamura et al., 2014; Sparks et al., 2008; Verhoeven, 2007). Researchers have illustrated cross-language phonological transfer from several L1 to L2 English in bilinguals of Korean-English (Wang, Park, & Lee, 2006),

Italian-English (D'Angiulli et al., 2001), and French-English (Comeau, Cormier, Grandmaison, & Lacroix, 1999). The awareness of sound construction by individuals described as phonological awareness and linked to the acquisition of reading that also shows evidence of language transfer.

Furthermore, language transfer studies in different orthographies indicate that phonological awareness can be a well-established skill across languages, and the prediction ability of degree of literacy differs with orthography (Everatt et al., 2010). Further cross-language research on languages that differ in orthography will also be beneficial. Orthographies such as Hindi considered relatively shallow orthographies (Bhatia, 1993, 2014), see Chapter 3 for further details. The most dominant view in the existing literature according to authors such as Anthony and Francis (2005) specifies that reading development is highly reliant on the levels of phonological awareness acquired by the learner. Nakamura et al. (2014) measured the phonemic awareness, decoding skills, and syllable awareness of students who are now learning English as a second language in Grade 3. The first language of these students was Kannada, a Dravidian language spoken primarily in the state of Karnataka in south-western India, and which has an alphasyllabic orthography. The findings indicated that both syllabic and phonemic awareness were found to contribute to Kannada L1 and English L2 decoding, and that within and across language relationships between reading and phonological skills were established. However, only phonemic awareness was a predictor in English L2 decoding.

The word reading of an alphabetic language like English might facilitate the phonological awareness of a non-alphabetic first language. Additionally, the type of instruction necessary for learning to read an alphabetic and alphasyllabic orthography can lead to the growth of explicit phonological awareness. However, in order to develop phonological awareness among learners, reading instructions must emphasise grapheme-phoneme relationships.

Furthermore, Van Staden (2016); Van Staden and Purcell (2016) conducted a quantitative research study to evaluate the significant predictor in improvements made by second language learners in Sub-Saharan Africa. Bourgoin (2014) utilized multiple hierarchical regression analysis of the data from Grade 3 children and found that the L1 English characteristics of phonological awareness were associated with L2 French reading competence. Sources of individual differences in L1 reading skills, such as phonological awareness and ability to identify, separate, or combine sounds, have all been associated with individual differences in the reading skills of L2 readers. Strategies such as effective language exposure, improving reading proficiency, developing vocabulary, and word recognition abilities, could lead to the second language learners being better able to work upon their reading capabilities.

2.5.2 Transfer of morphological awareness from L1 to L2

Jarvis and Odlin (2000) examined the degree of transfer of morphological units among Finnish and Swedish speakers in English. Their empirical research provided not only confirmation of the transferability of morphological awareness across languages but also an empirical basis for this concept. Duncan, Casalis, and Colé (2009) observed that when examining the linguistics skills of English language speakers learning French, the explicit awareness of derivational morphology played a crucial role. Derivational morphology is the ability to create new words through the addition of prefixes or suffixes such as *un-* or *-ness*. For example, *unhappy* and *happiness* derive from the base/root word *happy*. The development of derivational morphology was observed to be high among the French L1 speakers who were better able to apply and generalise this knowledge to produce meaningful derivations in their L1 and L2. In addition, French speakers showed better word recognition and morphological processing compared to English speakers. Similarly, Wang and colleagues (Wang et al., 2009) examined the contribution of morphological awareness in word reading and found that morphological

awareness was associated with word reading from Korean L1 morphological awareness to English L2 word reading. They suggested that those who can comprehend the morphological structure of their native language find it easier to understand a foreign or second language that they aim to learn. It is also essential to notice that the effect of morphological awareness could be independent of the impact made by phonological awareness on reading across different languages.

Given the above associations across linguistically different languages, morphological awareness may also be a skill that can reveal common characteristics of development across two different orthographies. Several researchers have investigated the cross-language effects of L1 morphology (Hancin-Bhatt & Nagy, 1994; Jarvis & Odlin, 2000; Koda, 2000). Hancin-Bhatt and Nagy (1994), for example, associated the ability of Spanish–English bilinguals. The authors' findings suggested cross-language influences might be factors in children's ability to recognize individual words and learn morphological knowledge.

Kirby and colleagues (Kirby et al., 2012) reported findings which showed the importance of morphological awareness in the first three years of a child's life for language and reading acquisition. Casalis and Louis-Alexandre (2000), Kuo and Anderson (2006), and Nagy et al. (2006) all contend that children often have implicit knowledge of morphemes. Making this knowledge explicit at a young age could help bilingual children develop better L2 abilities. Therefore, it can be concluded that morphological awareness occurs at set points in children's development and thus incrementally influences their language abilities.

Furthermore, Chen and Schwartz (2018) highlighted the important role of linguistic background of a learner (including level of skills in their first language) that must be considered when developing reading instructions for second language learners. Good morphological knowledge in the primary language assists the learner in acquiring better reading ability in the

second language. Therefore, a focus on explicit and systematic instruction in morphological awareness should lead to improvements in bilingual students' literacy and vocabulary development.

Yang, Cooc, and Sheng (2017) observed that bilingual readers can benefit from training and better knowledge acquisition on phonological awareness, vocabulary, decoding skills and morphological awareness that widens their linguistic knowledge. Further, the linguistic knowledge of the first language can support the learning of the second language. Because there are both similarities and differences between the structures of languages, we should consider the first language of pupils learning English.

2.6 Role of vocabulary knowledge

The requirement for successful reading is not only decoding of words but also the capability of understanding the meaning of the words. Therefore, vocabulary knowledge is an important factor for successful reading (Anderson & Freebody, 1981). Wise, Sevcik, Morris, Lovett, and Wolf (2007) observed that receptive (hearing) and expressive (identifying objects) vocabulary found to be predictive in the development of reading ability. Beginners use the words they have heard before to make sense of the print. Furthermore, understanding word meanings is essential for extracting meaning from text. Therefore, vocabulary knowledge plays an important role in learning to read (Nichols & Rupley, 2004). These researchers promote that vocabulary is an important aspect of reading and writing with others literacy ability. In addition, it is important to have good vocabulary knowledge in L2 because it helps an individual to continue a conversation, and a better grasp of vocabulary knowledge can improve the ability of an individual to read, write, listen and talk in an L2 (Nichols & Rupley, 2004). Norbert Schmitt, Schmitt, and Clapham (2001, p. 55) stated that vocabulary is "the building block of language and the single most important area of L2 competence" that reflects

the academic achievement of children and adults (Naeimi, Soltani, & Damavand, 2013; White, Graves, & Slater, 1990). Therefore, in the current study to examine the specific effects of phonological and morphological skills in reading, vocabulary was controlled.

Both vocabulary and reading improved by better morphological awareness and by decoding experience. Researchers have observed that morphological awareness acquired by the readers assists in improvising the word reading, reading comprehension, spelling and vocabulary (Apel et al., 2012; McCutchen, Green, & Abbott, 2008).

These studies show strong links between phonological processing skills and vocabulary knowledge. Additionally, vocabulary and reading ability improve with better morphological awareness and decoding. Studies examining the relationship between reading, vocabulary, morphological awareness, and phonological awareness skills have indicated that among children developing normatively, these skills are indeed related.

2.7 Assessment of Morphological and Phonological awareness in bilingual readers

Yang and colleagues (Yang et al., 2017) observed that bilingual readers could benefit from training and better knowledge acquisition on phonological awareness, vocabulary, decoding skills and morphological awareness that widens their reading knowledge. Further, the reading ability of the first language can support the learning of the second language. The similarities and differences between L1 and L2 related to the structure between languages for which, at least at the initial stage of learning, it is important to understand the words in order to inculcate phonological and morphological knowledge in order to make an effective transfer language.

Łockiewicz and Jaskulska (2019) explored the reading ability in a group of Polish speaking bilingual students and reported those with better linguistic skills, demonstrated L1 phoneme awareness in their L2 English reading. The better phonological and morphological skills within language might lead to the effective reading ability among bilingual learners. Researchers have also found that the sequence with which bilingual children acquire morpheme skills in L2 has properties in common with the sequence evident for L1 (Brown, 1973; Dulay & Burt, 1974; Paradis, 2005). Duncan (2018) found that meta-linguistic awareness affected by the mutual involvement of phonemes and morphemes, and such relationships may be influenced by the differences that emerge due to the spoken and written forms of two or more languages.

In alphasyllabary orthography, Nakamura et al. (2014) and R. Mishra and Stainthorp (2007) found that due to the contribution of phonological awareness in English reading, bilingual children whose L1 was alphasyllabary had a capacity of better L2 English reading. On the other hand, it is easier for bilingual children who can understand their first language's morphological structure to understand a foreign or second language that they are learning to read. It is also essential to note that the influence of morphological awareness on reading across different languages could be independent of the impact of phonological awareness.

Chen and Schwartz (2018) highlighted the important role of morphological awareness in language comprehension including reading, spelling, writing, and vocabulary development among the bilingual readers. The linguistic background of a learner (including levels of skills in their first language) must considered when developing reading instructions for second language learners. Good morphological/phonological knowledge in the primary language assists the learner in acquiring better reading development in the second language.

2.8 Conclusions leading to the Present Research

The purpose of this research is to develop the bilingual theory of Hindi and English decoding and to examine the cross-linguistic influence of L1 Hindi to L2 English reading. Well the same, the models that researchers bring from reading studies in various orthographies and which may prove to be diverse in different languages can be taken into account in the context of reading theories in general, consistent with studies supporting the reading processes in various orthographies to establish a reading theory (Frost, 2012; Perfetti & Harris, 2013). When having the similar results in different orthographies in reading researches, it is possible to move towards the reading model. Because these studies have been occurring overtime to determine the reading processes among children and adults. It is important to study orthographies different from English.

In addition to the growth for a reading theory, the investigation of Hindi orthography is of interest because there are interesting patterns in the way in which it can be read and because it is alphasyllabic (see Chapter 3 for further details). Hindi appears to lack over-all linguistic studies, with the few articles that do exist being of a more-or-less limited description. In this study, it examines the contribution to the Hindi and the English languages made by the morphological and phonological skills. It also intended to examine the contribution made by the Hindi-language reading skills to English reading, characterized by morphological and phonological skills.

The evidence discussed above in literature suggests that both phonological and morphological awareness can support the development of reading ability. However, there is a lack of research looking at these skills within Hindi-speaking learners, something that the current study aims to investigate (also stated before under section 1.7). There is also a lack of data considering whether such skills developed in Hindi as a first language can facilitate reading development

in English, an important foreign language for Indian students, and therefore a potentially interesting context in which to study L1 to L2 transfer. The following chapter discusses the Hindi language/script and the context of education within India (specific north India) has been covered in next chapter (chapter 3). A basic understand of the Hindi alphasyllabic orthography will support an understanding of the measures developed in the current work and interpretation of the data. Therefore, this will covered in Chapter 3 before the methods and results described in following chapters, and the findings discussed in the final chapter.

Chapter 3 Languages: Hindi and English

3.1 Introduction

This chapter aims to describe the language and reading context in which the research was undertaken. The study included children who were Hindi-English bilingual speakers, and the focus of the research was to develop an understanding of phonological and morphological awareness in reading skills among young Hindi-English bilinguals. This chapter provides background information about the Hindi language and its reading system. Initial Hindi reading instructions based on phonics. The initial reading starts in Kindergarten where children start learning letters and their associated syllables/phonemes. Grapheme-phoneme correspondence rules introduced gradually. Children taught by grapheme-phoneme conversion slowly to comprehend words. Children can initially learn inaccurate stress tasks, but they learn them correctly with repeated practice. Generally, the strong link between meta-linguistic awareness and a teaching method focused on phonics should make it reasonably easy for Hindi readers to learn phonological mapping and word identification.

3.2 Hindi Language

After Mandarin, Spanish and English, Hindi has the fourth largest number of native language speakers, with almost 260 million people world-wide (Lewis, Simons, & Fennig, 2014), and Hindi is a direct descendant of Sanskrit through Prakrit (one of the Ancient Indo-Aryan language) and Apabhransha (Middle Indo-Aryan language). As well, it is considered to be impacted by Dravidian languages (Telugu, Tamil, Kannada, and Malyalam spoken mostly in southern India), as well as Turkish, Persian, Arabic, Portuguese and English.

Hindi is the primary language in India, and is the local language of most speakers in North India. Hindi is not only the official language of India but also serves as a language that connects people for past several decades. Nationalists made it the means of communication at a national level, following which it turned into a link language and acquired the position of official language after Independence of India (Chandramouli & General, 2011). Article 343(1) of the Indian Constitute states that, Hindi in Devanagari script, will be the official language of the Union. The international form of Indian numbers and letters is the form of figures used for the official purposes of the Union. Article 351 of the Indian Constitution also states that it shall be the responsibility of the Union to endorse the spread of Hindi language, to grow it so that it may serve as a medium of instruction and expression for all the essentials of the multiple cultures of India. The responsibility also includes protection of its development by blending it with other languages of India, as stated in the Eighth Schedule of Indian Constitution. It was anticipated that Hindi would become the sole working language of the Union Government by 1965, as per directives in Article 344 (2) and Article 351 in constitution of India, in addition to state governments being free to function in the language of their own choice (Jain, 1969).

Hindi written in the Devanagari, inspired by the Sanskrit script. There are 48 letters and additional diacritic symbols in Hindi ((Daniels & Bright, 1996). It can be argued that the Hindi script exhibits both syllabic and alphabetic features. It is aligned to other alphabetic scripts such as Arabic and Persian by the fact that phonemes are graphemically labelled. However, consonants in Hindi have an inherent associated vowel, unlike many other alphabetic orthographies in which consonants usually stand alone as phonemes, which represent Hindi as a syllabary. These Indic scripts have suggested to be semi-syllabic since graphemes representing consonants are grouped spatially together with vowel signs to form a syllable set (Gaur, 1995).

3.2.1 Hindi orthography, Phonology and Phonological Awareness

The Hindi language known as alphasyllabary. The Devanagari script, which used to write Hindi, is alphasyllabary and a descendent of the Brahmi script. Padakannaya, Pandey, Saligram, and Ranga Rao (2016) mentioned that the majority of Indian scripts originating from "Brahmi" are classified as *'Akshara'*. Either the syllabic or the phonemic scripts vary from Akshara. In Devanagari, the fundamental writing unit is called akshara, and it is known as alphasyllabic because it represents approximately one spoken syllable containing two phonemes (sounds) – one consonant (C) and one vowel (V), that is, CV (e.g., म + (ऊ) independent form (ू) diacritic form = मू (Bright, 1999).

It has to be considered carefully when discussing about Hindi, that Hindi is relatively phonetic regardless of it being visually complex (R. K. Mishra, 2019). Sounds in Hindi language are categorised based on the manner and place of articulation. Sounds consist of vowels, diphthongs (combination of two vowels), and consonants with an integral implied schwa vowel. The schwa vowel sound does not have an independent grapheme form in the writing (Vaid & Gupta, 2002). Consonant clusters are written either one above the other, or with a specific sign combined to point toward the absence of the schwa. For example, the word क्रम (/krəm/ meaning <order>) has a consonant cluster of क and र making क्र /krə/ with a hidden schwa. Vowels are marked as diacritic signs in Hindi whenever needed. For example, the word /कलम/ meaning <pen> does not contain diacritic sign but the word किताब (/Kitab/ meaning <book>) is vowelized (कि <ki>= ि <i> and क <k>, ता <t>= त and ा <a>, ब <b>). Some words are vowelized with diacritic marks (*maatra*) which are used to mark the tones of the syllables in which the marked vowels occur, too. Diacritic marks can occur in word's initial, medial, final positions and around the consonant letters.

The pronunciation of words can be predicted in most cases from the written form of the word. There are no upper and lower case characters in Hindi unlike English. Hindi phonemes are classified in vowels and consonants. In Hindi, there are 11 basic vowels (see table 3.2). Table 3.1 presents the 36 basic consonant symbols according to their articulations. All Hindi vowels can written in two forms. First, they can appear alone (called standalone form). For example, in the Hindi word आम ('mango') comprises the vowel आ '/a:/'. The other is the diacritical from, called the matraa form, which works as a consonant modifier. For example, in the word दान ('donation') [/da:n/], the vowel आ '/a:/' is attached with the consonant द /'d'/ (Malviya, Mishra, & Tiwary, 2016). There is also a horizontal bar drawn above the letters, which helps to define the word boundaries so that words are separated from each other in text.

Table 3.1

Alphabets used in Hindi orthography as in the International Phonetic Alphabet (IPA).

Manner of articulation → Place of articulation ↓	Voiceless Unaspirated		Voiceless Aspirated		Voiced Unaspirated		Voiced Aspirated		Nasals		Semi vowels	
	Form & Name	Sym-bol	Form & Name	Sym-bol	Form & Name	Sym-bol	Form & Name	Sym-bol	Form & Name	Sym-bol		
Velar	क /kə/	/k/	ख /khə/	/kh/	ग /gə/	/g/	घ /gʰə/	/gʰ/	ङ /ŋə/	/ŋ/		
Palatal	च /ʧə/	/ʧ/	छ /ʧʰə/	/ʧʰ/	ज /ʤə/	/ʤ/	झ /ʤʰə/	/ ʤʰ/	ञ /ɲə/	/ɲ/	य /jə/	/j/
Retroflex	ट /ʈə/	/ʈ/	ठ /ʈʰə/	/ʈʰ/	ड /ɖə/	/ɖ/	ढ /ɖʰə/	/ɖʰ/	ण /ɳə/	/ɳ/	र /rə/	/r/
Dental	त / t̪ə/	/ t̪ /	थ /t̪ʰ ə/	/t̪ʰ/	द /d̪ə/	/d̪/	ध /dʰə/	/d̪ʰ/	न /nə/	/n/	ल /lə/	/l/
Bilabial	प /pə/	/p/	फ /pʰə/	/pʰ/	ब /bə/	/b/	भ /bʰə/	/bʰ/	म /mə/	/m/	व /ʋə/	/ʋ/
Glottal	ह /hə/	/h/										
Sibilants	स /sə/	/s/	श /ʃə/	/ʃ/	ष /ʂə/	ʂ/						
Ligatures	क्ष /kʃə/	/kʃ /	त्र /t̪rə/	/t̪r/	ज्ञ /gjə/	/gj/						

Note: Retrieving from word recognition in a semi-alphabetic script. Copyright 2002 by Vaid, J., & Gupta, A., 2002.

Table 3.2

The Devanagari vowels (both Independent and dependent form)

Sr. No.	Independent form	IPA	Dependent/Diacritical form(Matra)	Example with letter /p/
1.	अ	/ə/	No sign (schwa)	प/pə/
2.	आ	/a/	ाा	पा/kā /
3.	इ	/ɪ/	िॆ	पि/pɪ /
4.	ई	/i/	ाी	पी/pi /
5.	उ	/ʊ/	ॖ	पु/pʊ /
6.	ऊ	/u/	ॗ	पू/pu/
7.	ए	/e/	ॆ	पे/pe/
8.	ऐ	/ɛ/	ॎ	पै/pɛ /
9.	ओ	/o/	ाो	पो/ko/
10.	औ	/aʊ/	ाौ	पौ/paʊ /
11.	ऋ	/r̥/	ृ	पृ/pr̥/

Note: Retrieving from word recognition in a semi-alphabetic script. Copyright 2002 by Vaid, J., & Gupta, A., 2002.

Nasalised vowels are also important in Hindi (R. K. Mishra, 2019). There are two nasalised vowels and uses as diacritic signs: *Bindi*/*anuswra* and *ardhchandra* or *chanderbindu*/*anunasika* (Gill & Gleason, 1969); *Bindi /* ◌̇ */*: A dot above the consonant is called *bindi* (or *anuswra*), representing the nasal combination with the subsequent consonant (Nigam, 1975). This represents the nasalized vowel "न" in Hindi or its equivalent "*n*" in English. . For example, in the word पंख /pankh/ meaning *feather*, a small dot on the consonant प /pa/ indicates the nasal combination with the consonant ख /kh/. *Ardhachandra*

or *chanderbindu* / ँ /: A dot in the shape of a half moon is an *anunasika* (nasal) sign, which also denotes the nasalization of the vowel. This represent nasalized vowel "न" in Hindi or its corresponding "*an*" in English. In Hindi, known as चन्द्रबिन्दु (*Chandrabindu*, from Chandra means '*moon*' and bindu means '*dot*') because it shapes resembling a dot on the moon. You can visualize the word combination as अ + ँ = अँ. The nasalized symbols come on preceding vowel or consonant. For example, in the word हाँ /haan/ meaning *yes*, a symbol above the vowel sign /an/ denotes the vowel's nasalised form (HindiLanguage.Info, n.d.)**.**

Phonological awareness is the awareness towards the individual sounds of words and demonstrates the awareness of blending sounds together as well as differentiating the separate sounds to understand the formation of a word (Fracasso et al., 2016). Phonological awareness determines the letter-sound knowledge and skills required for processing and manipulating the speech sounds and structures including syllables, rhymes and phonemes (Kaur, Anand, & Subbarao, 2017). The link between phonological awareness has been widely studied in the reading research literature to understand the factors underlying reading abilities and difficulties, especially among children in alphasyllabic orthography (Nag & Snowling, 2012). One of the reasons that children experience reading difficulties may correspond to inability of processing speech sounds, which highlights the importance of phonological awareness (Rao, 2012).

According to the grain size theory, children are able to recognise smaller phonological units only when they are able to process the larger sound units (Reddy & Koda, 2013). Primarily the phonological units of the spoken language are developed and its related phonological awareness enhances if the learner is engaged in the procedure of encoding and decoding the phonological information in writing (C. Y. Lin, Cheng, & Wang, 2018). In decoding, the

learner distinguishes the graphemes through sounding the phonemes used for recognizing words.

In the case of bilingual readers, it is observed that the phonological awareness acquired to learn reading in the first language can be transferred to the second language (C. Y. Lin et al., 2018). Furthermore, the decoding skills established in one language can help learning decoding words in another language (Mirza, 2018). It has also argued that cognitive processes should be relatively similar in the languages that share similar signs and symbols in their script (e.g., Spanish and English both utilize Roman script). Such an argument may lead to hypothesize that when the orthographic signs and symbols are not very similar in the two languages that a bilingual child is learning to read (e.g., Hindi and English with one using Akshara and the other using Roman script), cognitive processing might be different which is worthy of further research.

Research on phonological awareness in monolingual and bilingual children also shows various findings. On one hand, some researchers believe that bilingual children may have better phonological skills since they have developed decoding skills in their L1 (Marinova-Todd, Zhao, & Bernhardt, 2010). On the other hand, there are studies arguing that that in certain cases bilingual children demonstrate a difficulty in learning second language (Shum, Ho, Siegel, & Au, 2016) since they may get confused with the two language (sound) systems, especially when they are at their initial stages of learning decoding skill.

When considering phonological awareness among children (young age), Kaur and colleagues (Kaur et al., 2017) found that children within the age group of 5 to 5.5 years are able to develop the Hindi sounds/phonemes. Sood, Joshi, and Sharma (2015) suggest that Hindi children gradually enhance their phonological awareness, so that over the period 5 to 6 years of age, they develop a greater understanding of grapheme-phoneme correspondence. These authors

also suggest that in this period, Hindi children are able to write words using similar letters. Phonological awareness has a crucial impact on the reading and spelling ability; although it may not have a direct impact on the vocabulary skills (Fracasso et al., 2016), the development of literacy skills can support language development, including word knowledge. This signifies the relevance of acquiring phonological awareness. Indeed, cross-language studies of literacy development have emphasized on the important role of phonological awareness in learning to read and write in different languages. In addition, some studies (Khan & Bajre, 2018; Reddy & Koda, 2013) have revealed a mutual, bidirectional association between phonological awareness and reading ability among individuals. Phonological awareness accelerates and assists in the development of early reading, but equally, reading acquisition seems to lead further development in the awareness of sounds at the level of the phoneme. When learning to read, it is essential for children to attain fundamental decoding abilities and apply grapheme-phoneme correspondence rules to identify consonant clusters, syllables, and whole words with higher precision (Gafoor & Remia, 2013). With the understanding of phonological representation, this becomes easier.

3.2.2 Hindi Morphology and Morphological Awareness

Morphology is the domain defining the formation of words based on meaningful units (i.e., morphemes). Morphological awareness relates to the understanding of systematic relationship among morphemes (smallest meaningful unit of the language) that assists discovering the meaning of words and perhaps retaining them. Morphological awareness has been identified to have a positive impact on reading abilities, vocabulary among learners (Curinga, 2014).

Morphology can be categorized into two conventions, derivational and inflection morphology (Asli-Badarneh & Leikin, 2019). While the first refers to the formation of a word by extending an existing word with an addition of either a suffix or prefix, the latter deals with the

categorization of words as per their grammatical specification. Derivational morphology is more complex and less transparent, where it alters the meaning of a word, thereby it is essential to acquire inflections first (Haspelmath & Sims, 2013). Acquiring morphological awareness (i.e., the ability to understand the formation of words and recognizing morphemes) is integral to the language-learning process. Bilingual children seem to be better in morphological awareness compared to monolingual children (Lam & Sheng, 2016). Additionally, when bilingual children are learning a second language, morphological awareness can be facilitated in both their first and second language (Schwartz, Taha, Assad, Khamaisi, & Eviatar, 2016). As asserted by Deng, Shi, Dunlap, Bi, and Chen (2016) that is, children may have a better understanding of inflections for L2 as compared to monolinguals, where other external factors such as parents' educational background, languages used in their environment (i.e., society and school) which all may have an impact on the level of their morphological awareness (Hasna, 2016).

Competent morphological awareness in L1 may lead to an enhancement of word reading and reading ability in L2 for children. Few studies have found a correlation between morphological awareness and reading in early years children, where increase in reading abilities increases morphological awareness and vice versa (Deacon, Kieffer, & Laroche, 2014). Morphological awareness is developed progressively among children, where in preschool, they are able to identify morphemes considered with derivation (Gafoor & Remia, 2013). Morphological awareness is found to be essential in understanding the complexity of a language and with age, children are better able to understand the meaning of compound words, thus, increasing the depth of word knowledge that can be applied in learning other secondary languages. It has a significant contribution to understanding the differences in reading both Hindi and English languages.

Hindi morphology includes the study of the internal structure of the word and its form in various uses and constructions. Hindi morphology is generally divided in two parts – derivational and inflectional morphology. Derivational morphology involves the procedures by which new words form existing lexemes by adding affixes. As an example in Hindi अच्छा (good) + ई = अच्छाई (goodness) (Hindilanguage.info, n.d.). The processes by which many forms are formed from a lexical stem are involved in inflectional morphology. Hindi is rich in inflection morphology and this can be recognised by the fact that there are typically around 7-8 inflected word forms of nouns in English, but in Hindi it can be up to 40 or more (Vikram, 2013). Inflection in Hindi implies word modification to convey different grammatical categories, such as gender, tense, person, number and case. In English, for instance, the words for the tense are inflected. To convey a verb in the past tense, the suffix -ed is added to the word (Jump- Jump-ed). The suffix -ing is attached to the verb (Jump- Jump-ing) in the present continuous tense. For the number (Singular noun: boy) and (Plural noun: boys). To express the multiplicity of the noun, the suffix -s is attached. The words are inflected in Hindi in order to convey the gender, number, person and case in addition to the tense. In Hindi, either by adding a new suffix or by modifying the tone of the word endings, the words are inflected. Let us just take an example of verb /पढ़-ना/ (padh-naa) = to read. Here the root of the verb is /पढ़/ (padh). For masculine gender in present tense: /मैं पढ़- ता हूँ |/ (main padh-taa hoon) = I read. Suffix – /ता/ (taa) is added to the root of the verb. For feminine gender: /मैं पढ़- ती हूँ |/ (main padh-tee hoon) = I read. Suffix – /ती/ (tee) is added to the root of the verb. So, the verb /पढ़-ना/ (padh-naa) is therefore inflected in order to express a person's gender in the present tense: /मैं पढा |/ (main padhaa) = I read (past tense). The root of the verb (पढ़) is inflected by adding the sound of -आ (aa) at the end of the word. For feminine gender: /मैं पढी/ (main padhee = I read). The root of the verb /पढ़/ is inflected by adding the sound of /–ई/ (-ee) at the end of the word. So,

the verb /पढ़-ना/ (padh-naa) is thus inflected in the past tense to convey a person's gender. For the multiplicity of the noun, let us take the instances of inflection in Hindi. For masculine gender, Singular: /लड़का/ (ladkaa) =Boy, Plural: /लड़के/ (ladke) = Boys. The end sound of (-aa) in /लड़का/ is changed to (– e), for feminine gender Singular: लड़की (ladkee) = Girl. The ending of word sounds (-ee). In plural form of word: लडकीयाँ (ladkeeyaan) = Girls, the word changed at the end to इयाँ (eeyaan) (HindiLanguage.Info, n.d.). There is no use of verbs as gender identification in English but in Hindi verbs can be used for gender identification.

3.3 Differences and Similarities between Hindi and English

Hindi is a national language of India and English is co-official language for academic and administrative purposes in most parts of India. Hindi and English languages belong to the same sub-group of the Indo-European family. Hindi originated from Sanskrit and its written form has alphasyllabic features (Masica, 1993) and uses the Devnagari script, whereas the written form of English is alphabetic and is based on Roman script (Pasquarella, Chen, Gottardo, & Geva, 2015). The Devnagari script has consonants, vowels, and symbols for nasal sound. English also includes consonants and vowels, but not symbols for nasal sound. In these two languages, letters stand to symbolise phonetics. In both languages, letters can be classified by place of articulation. Moreover, both orthographies are read and written from left to write. Unlike English, Hindi has a horizontal bar joining letters to form word, which may improve the perception of word boundaries. In Hindi, the use of dependent form (or *matra*) is non-linear and consists of lines, hooks or combinations of both placed above, below or to the left or right of the consonant with which the vowel articulates. In contrast, there is no dependent form of vowels in English language.

Bilingual children are capable to gain more efficiency and awareness towards their languages if there can identify prominent differences between the languages. This enables them to acquire better language skills, including an awareness of features such as phonological (as discussed above) and syntactic forms (Marinova-Todd et al., 2010). Given that decoding is dependent on the phonological information related to a specific script, variations in decoding ability are likely across different languages. Cross-linguistic connections can only be established if the learner is able to map the symbols with sounds in both the languages. In Hindi, it is comparatively easier to pronounce the words as they are written, whereas in English, the spelling and pronunciation are not always in correspondence (S. Singh & Sarma, 2011). This may result in difficulties for Hindi first language children when learning English spelling: an over-reliance on letter-sound relationships produced by the more regular nature of Hindi may lead to reading and spelling errors in English. Given that phonological awareness skills can support the development of reading, which will then impact on vocabulary knowledge and comprehension skills, difficulties with English language acquisition may emerge for children familiar with Hindi (Gafoor & Remia, 2013). Further, the pronunciation differs in Hindi and English as Hindi comprises of half vowels and double consonants established in English. For example, in English, the vowel 'e' is equivalent to 'ए' in Hindi, which is pronounced as 'ae'.

Hindi has more inflected word forms than English, and therefore may be considered a more enriching morphology (Vikram, 2013). However, there are also similarities in morphological forms. For example, the verb tenses of both languages represent present, past, and future. Furthermore, to make conditional sentences, Hindi makes use of the future tense in the independent clause like English; for example: 'अगर मैं भारत जाऊँ तो मैं अपने भाई से मिलूँगा – If I go to India, I will meet my brother'. In Hindi language, sentence structure supports the use of

subject-object-verb, whereas English focused on subject-verb-object word order (Vikram, 2013).

Overall, such differences in phonology and morphology between Hindi and English can lead to confusion and difficulties in reading and writing if the learner has a lack of awareness pertaining to both these concepts in the two languages. A clear understanding of phonemes and morphemes would seem likely to be important for the acquisition of vocabulary, word formation, meaning comprehension in both languages. However, the precise influences and potential interactions between these two areas of language processing and reading development in Hindi-English bilinguals has yet to be established. The current research aims to investigate both phonological and morphological awareness in young learners of Hindi and English literacy to inform models of reading development and biliteracy. In addition, given that vocabulary has been linked with phonological and morphological awareness and predicts word reading competence, the current study also examines whether these skills are related to vocabulary knowledge and are then related to reading ability via vocabulary knowledge. Therefore, assessment measures have been developed and used to investigate the selected study participants for reading ability, phonological awareness, morphological awareness, and vocabulary knowledge.

3.4 Hindi and English Assessment Measures/Tools

Sixteen measures (eight in each language) were developed (see details in Chapter 4) to examine the effects of phonological and morphological awareness on reading among Hindi and English bilingual children in India. These measures are mostly based on main course book contents. The tests measured word reading, phonological awareness, morphological awareness and vocabulary knowledge in Hindi L1 and in English L2.

This research study used the following parallel measures in Hindi L1 and English L2:

Reading: Single Word Reading

Phonological Awareness: Sound Isolation (initial sound), Sound Isolation (final sound), Sound Deletion, Sound Blending and Sound Substitution

Morphological Awareness: Sentence Completion, Base Word and Word Structure Vocabulary: Hindi Vocabulary Test and PPVT – IV (Peabody Picture Vocabulary Test).

All the measures except PPVT - IV, used in the current study were developed using curriculum and textbook materials used in the selected grades for teaching and learning languages (Hindi and English). Given below is an outline to understand the teaching and learning process of these languages in schools from kindergarten to Grade 2. This information is helpful to the reader in understanding the description and design of measures developed for selected year levels.

3.5 Curriculum and teaching languages (Hindi and English) in kindergarten and primary schools

Children start to learn both English and Hindi from the first day of their schooling. All instructions given in Hindi as well as in English. Rote learning and value-based education was opted by these schools for students from scratch. Most schools in Delhi follow the curriculum given by the National Council of Educational and Research Training (NCERT) and the Central Board of Secondary Education (CBSE). This board of education is for public and private schools under the Union Government of India. Years of school called Class/Grade in India. Schools often divided into four units: 1. Pre-primary – nursery, kindergarten (KG), 2. Primary – Year 1 to Year 5 (first Class to fifth Class) and 3. Middle School – Year 6 to Year 8 (sixth

Class to eight Class) and 4. Senior Secondary School - Year 9 to Year 12 (ninth Class to twelfth Class). Kindergarten/Pre-primary Schools' average timing is from 9:00 am to 12:30 pm from Monday to Friday except vacations and holidays. For first Class, their school timing increased by one and half or two hours usually from 8:30 to 1:30 or 2:00 pm, dependent on the climatic conditions and instructions given by educational boards such as the NCERT or CBSE. The everyday timetable of schools in divided into six or seven periods with 20 or 25 minutes of recess. Each period is approximately 30 minutes dependent on the schools' timetable with separate subjects. For example, after morning assembly, the first period is Hindi for 30 minutes then the next 30 minutes is for English then Mathematics, Environmental Studies followed by recess. After recess extra-curricular activities scheduled like Art and Craft, Games, General Knowledge, Computer, Library, Music, Gardening.

Every year starts in the month of April and ends in March, after final examinations. A year has half-yearly and yearly examinations. First term/half-yearly exams scheduled in the month of September whereas the second terms /final exams scheduled in the month of March. Second term results are considered for the result. The month of June is the time for summer vacations. Schools reopen in first week of July. From July to March, schools remain functional without long vacations.

3.5.1 Use and teaching/learning of languages (Hindi and English) in schools

According to CBSE curriculum, students will study two languages up to year twelve (twelfth Class/Grade). From day one of their schooling, children learn English and another language could be Hindi or any other mother tongue of students (their regional language). In Delhi/National Capital Region (NCR) and in nearby states, Hindi is an important language in schools. In formative years of development, children need to acquire skills of listening and speaking, and then followed by reading and writing. Therefore, the language curriculum

focuses on building vocabulary, syntax, accent, understanding of sounds, and reading through formal and informal learning modes. (Vagh, 2004) noted, "Children acquiring the societal and school majority language have possibility of accessing a wide pool of semantic knowledge of everyday life situations as well as in schools (p.8)".

3.5.2 Teaching of English from LKG to Second Class/Grade

LKG (Lower Kindergarten) – The students will be four- to five-years-old at this level. Children develop the knowledge of picture reading relating to their surroundings. Recognition of letters Aa – Zz orally, makes children aware of the sounds through models, drawing, things in the environment, family members' names, friend's name. Matching the pictures with letters and later with words are the basic objectives. They learn the name of body parts, counting from one to ten, fruits/vegetables, animals, and rhyming words (to improve listening skills). Formally and informally, children learn the matching of sound to letter/word the sound of blending letters, develop the initial sense of word structure, and develop the oral capability of using appropriate words to fill in the gaps according to the sentence. They start reading words with two to three letters, and start to understand 'one and many'.

UKG (Upper Kindergarten) – Participants will be five – to six-years-old at this level. Aa – Zz oral and written work with pictures, rhyming words, reading two- to four-letter words, opposite words, one and many (adding 's'), blending letters, names of colours, body parts, use of this and that are taught in this class. Students can match the sounds to letters/words, learn to make new words by deletion of sound. Formally and informally, children extend their understanding of simple word structure and matching words to fill in the gaps according to the sentence. Learning outcome is recognition, vocabulary and developing speaking skills. Implementation is oral interaction, written work, homework, worksheets, activity book,

rhymes, storytelling, interactions with words and can relate the words with environmental objects.

Grade 1/ First Class – Age of students will be six- to seven-years in this class. There is revision of pre-primary language concepts. Children start reading more than three- to four-letter words with consonant clusters. The phonic drill of a, e, i, o, u words, use of this/that, here/there, these/those, off/on, opposites, naming words, knowledge of prefix/suffix, singular/plural, places and days of the week and months, reading and understanding poems. Children are able to make new words from substitution of letters and their sounds, able to work with deletion of letter sounds and make new words. In addition, they expand their understanding of base words and simple word structure by formal and informal learning mode.

Grade 2/ Second Class – Children will be aged from seven- to eight-years. A student can read and write both languages, except some difficult words. They understand nouns, pronouns, prefix/suffix, use of this/that, was/were, here/there, use of 's' and es/ed, can make new words by phoneme substitution and deletion. Reasoning and thinking activities. Complete sentences with correct words, true/false. Children can perceive the intended meaning of words. Also, formally informally identify base words and word structure. Students have a separate English workbook.

3.5.3 Teaching of Hindi from LKG to Second Class/Grade

LKG – Recognition of letter names orally, fruits and vegetables names with the pictures, Hindi poems, knowledge of shapes and things in surroundings, storytelling, identification of animals with their names and pictures, recognition of names of colour with pictures, drilling, matching picture, one and many, and one to ten counting in Hindi. Children start with picture reading relating to their surroundings. Later in session, formally and informally children learn to match

the sound to letter/word, blending letters, developing the oral capability of using the right word to fill in the gaps according to the sentence, starts reading simple words with two- to three-letters and two or three diacritic signs (*matras*). They develop the initial sense of word structure through informal modes of learning. The conversation initiates with simple questions relating to their family and surroundings.

UKG – Revision of pre-primary language concepts. Formation of small words, knowledge of consonants and vowels, drilling, recognition of pictures with words, filling in the blanks with appropriate words, reading two- to four-letter words, use of diacritic signs *(matras)*, opposite words, one and many, reading words, blending letters, names of colours, body parts are taught in this class. Students learn matching of sounds to letters/words though isolation, blending and deletion. Formally and informally, children develop their understanding of simple word structure. Learning outcome is recogntion, vocabulary, developing speaking skills. Implementation isoral interaction, written work, homework, worksheets, activity book, rhymes, storytelling, interactions with words and can relate the words with environmental objects.

Grade 1 -. Revision of Grade 1 syllabus. Students can read more than three letter words; they have knowledge of diacritic forms *(matras)*. Students can match the words with pictures, Hindi rhymes, story reading, the formation of words and small comprehension taught in this class. Children can make new words from substitutions of letters and their sounds, students can work with sound deletion and make new words, opposites, naming words, knowledge of singular/plural, places and days of the week, reading and understanding poems and lessons. Children are able to answer questions based on lessons given in the book. In addition, children expand their knowledge of base words and simple word structure by formal and informal learning mode.

Grade 2 – Revision of Grade 2 syllabus. Students can read and write in both languages except some difficult words, can make differences between present, past and future sentences. Students can work on small comprehension, with multiple choice and long questions and answers. Children are able to fill in the blanks with or without options. They can make new words from the substitution of letters, also work with sound deletion, and make new words; children can perceive the intended meaning of words. Children have knowledge of genders, opposite words, naming words, knowledge of singular/plural, places, adding two words to make a compound word, days of the week and months. In addition, they understand base words and word structure.

The researcher developed the measures based on the teaching and learning resources provided in schools as discussed above, for conducting present study. Prior to the main study data collection, all measures were piloted with a different number of samples to examine the appropriateness (consistency and escalated mean scores from lower grade to higher grade level) of the tests, (detailed information is available in the next chapter).

Chapter 4 Development of Measures and Pilot Studies

4.1 Introduction

The aim of this chapter is to provide the background to the materials and methods used for developing the Hindi and English tools to measure the reading ability and language-processing skills of young children in Hindi and English.

This study developed a number of measures to investigate the relationship of children's reading ability with their phonological and morphological skills, and their vocabulary knowledge to determine the relationship of language processing with reading ability (Clay, 2001) in Hindi as L1 and in English as L2. Hence, for both languages, the following measures were developed: (1) a measure of reading ability (a single word reading test); (2) several measures of phonological awareness; (3) several measures of morphological awareness, and (4) a vocabulary knowledge measure.

The final versions of the measures were based on the results of a series of pilot studies conducted in Hindi and English. The tests were designed to be relevant and linguistically appropriate for the children. The language used in the measures was consistent with the national curriculum designed in Delhi, India. It was important to read the detailed curriculum to gain some knowledge of the expected language level of children in their particular class/grade. For example, how and what do the children in kindergarten (KG) and the initial three grades of school learn, what are the teaching methods used, how do they use the languages formally and informally (see section 3.5 in Chapter 3). The tests developed for this study were based on the English and Hindi textbooks, course books, school tests, and academic and colloquial language used in the school environment. In some studies, curriculum and textbooks were used as a guide for developing measures of students' reading ability (Gautam, 2017; Masilamani, 2019;

Samaraweera, 2019). Four experienced language teachers (two in each language) also gave feedback on which items to select for pilot testing. The teachers had, on average, 14 years of experience teaching Hindi and English to children in these grades, and therefore were able to suggest whether the items were suitable for the children's age and grade levels in terms of item difficulty and the number of the items. Teachers' suggestions were considered alongside the results obtained from the pilot studies. These teachers were trained in using a variety of methods to assess children's literacy progress. Because of their level of teaching experience, they were able to provide useful feedback on the items.

Five pilot studies were conducted to produce the final versions of tests appropriate for the young learners. A battery of eight subtests were developed for Hindi and English.

4.2 Participants of the pilot studies

Participants for the pilot studies were students of pre-primary (kindergarten) and primary schools in Delhi who spoke Hindi as L1 and English as L2. However, because children who spoke a third language could influence the study, participants were recruited on the basis of languages they were familiar with. Classroom teachers provided information about children's languages so that only bilingual (Hindi/English) children would be chosen to match the requirements of the study. In addition, all participants were asked seven background questions in Hindi and English to ascertain whether they were all Hindi and English speakers. (see Appendix A for English background questions with English measures and Appendix B for Hindi background questions with Hindi measures).

Since the study was recruiting young children, it was necessary to ask for consent from the school authorities, and parents or guardians. Appendices C, D, E, F, and G provide the information sheets and consent forms.

4.3. Research assistants

The researcher selected two research assistants to help with data collection: one full-time assistant and a relief teacher. Both were volunteers, who worked as primary school teachers/tutors, teaching Hindi and English. One research assistant had five years' teaching experience; the other had seven years. Their qualifications were also relevant to the study. The full-time research assistant was studying for a Master of Education degree and held a first-class Master of Arts degree. The relieving teacher volunteer had a Bachelor of Education degree and gave private tuition to primary school children. These qualifications enabled them to work in schools with children. They both had also studied Hindi and English as their main subjects in their secondary and tertiary education. Moreover, they were experienced working with children.

Prior to the pilot testing, the researcher explained the procedures for administering and scoring each measure. The research assistants then attended sessions over four days to see and learn how the test should be conducted. Following this, the researcher asked them several questions to ensure they understood the procedure for testing a child. For example, what details did they need to take from the child before starting the testing session? What will they do to make the child feel comfortable and ready for the test? What is the scoring procedure? How many times they will repeat a question for a child? When will they give a child a break during the test session? What will they do if any child becomes agitated or feels uncomfortable during the test session? The researcher sat with each research assistant in the first few test sessions to ensure they were using the correct procedures for testing children. The research assistants were also given the answer sheet for questionnaire. For the main study, a detailed protocol for training was developed for the tests in each language (Appendix I for English and Appendix J for Hindi).

4.4 Ethical Approval

Ethical approval for the research obtained from the University of Canterbury. This approval was for pilot testing and main study both. The researcher followed all the regulations and guidelines instructed by Educational Research Human Ethics Committee (ERHEC) to conduct research with human participants. The ethics approval letter and consent forms are available in the Appendix K.

4.5. Measures for Hindi and English languages

For the first pilot study, 21 tests were developed: eleven in Hindi and ten in English. These tests were divided into four levels according to the difficulty level of the items and their suitability for the participating children at Lower Kindergarten Grade (LKG), Upper Kindergarten Grade (UKG), Grade 1, and Grade 2. To the best of my knowledge, there were no standardised Hindi measures available at the time of the study. As a result, the researcher developed Hindi measures that were compatible with the purpose of the study, based on the format and testing procedures of the English measures (except for Akshara Recognition and Hindi Vocabulary measures from the first pilot study, and Story Retelling from pilot studies two and three). For the first pilot study, it seemed appropriate to use some 'easy', some 'medium difficult' and some 'more than medium difficult' items to test the performance of children. Prior to each test, the instructions were given in Hindi and English (as appropriate) to the children and one or two examples were presented. The tests are presented in the subsequent sections followed by the results of each pilot study, which eventually led to eight parallel measures in each language.

The tests were administered face to face, using normal school testing methods, such as paper-based reading. Computer-based testing was not considered to be appropriate for children at this

age and therefore less reliable; they lacked experience with computers and the schools lacked computer equipment. Children, particularly those in kindergarten, were not accustomed to using computers for reading or assessments; they were more likely to use computers to play games.

4.5.1 Scoring method for each measure selected for pilot studies

Children's responses for each question were recorded on an excel spreadsheet for scoring. Correct answers were scored a mark of one, while incorrect and no answers were scored a mark of zero. A total score for each measure was the sum of the correct answers. The exception to this was the marking of the measure of Hindi Vocabulary from pilot study 1 and Story Retelling from pilot studies 2 and 3. Sections 4.10.2 and 4.12.3 cover the scoring methods for these measures.

Table 4.1 presents all the measures developed for the first pilot study with their total scores.

Table 4.1

Hindi and English Measures for Pilot Study 1 (Detailed version of each measure has given in Appendix A)

	Measures	Sub-tests	Grade Level	No. of Items
	Language Understanding	1. Language Understanding	LKG & UKG	10
	Reading	2. Letter Knowledge	LKG & UKG	10
		3. Print Concept	LKG & UKG	10
		4. Word Reading	Grade 1 & 2	20
		5. Akshara Recognition	Grade 1 & 2	20
Hindi	Phonological Awareness	6. Rhyme Awareness	LKG & UKG	10
		7. Isolation (Initial sound)	LKG to Grade 2	10
		8. Isolation (Final sound)	Grade 1 & 2	10
		9. Sound Deletion	Grade 1 & 2	10
	Morphological Awareness	10. Sentence Completion	Grade 1 & 2	12
	Vocabulary	11. Hindi Vocabulary	Grade 1 & 2	60
	Language Understanding	1. Language Understanding	LKG & UKG	10
	Reading	2. Letter Knowledge	LKG to Grade 2	10
		3. Print Concept	LKG & UKG	10
		4. Word Reading	Grade 1 & 2	20
English	Phonological Awareness	5. Rhyme Awareness	LKG & UKG	10
		6. Isolation (Initial sound)	UKG to Grade 2	10
		7. Isolation (Final sound)	Grade 1 & 2	10
		8. Sound Deletion	Grade 1 & 2	10
	Morphological Awareness	9. Sentence Completion	Grade 1 & 2	10
	Vocabulary	10. English Vocabulary	LKG to Grade 2	12

4.6. Language Understanding Measure

Rationale

This task explores for the understanding of language in participants of four to five and five to six years old (LKG and UKG, respectively). They have developed language understanding to some extent by this stage. While other tests being developed, this measure seen as an important way to measure the children does language understand in both languages at this early stage of life?

Design

For pilot study 1, 13 questions were initially developed to measure the understanding among young children of both Hindi and English. The questions were based on their daily routines and basic information they had used, particularly in their schools. These questions were discussed with the teachers of kindergarten classes, who have conversations with children on a daily basis in each of these languages and knew which questions would be familiar or unfamiliar in both languages. After this consultation, three questions were thought to be outside the children's experience. Therefore, ten questions were retained for the Understanding Language measure for LKG and UKG children in Hindi and English.

Procedure

The tester entertained the children with toys to build rapport and to help each child speak in a confident and relaxed manner. They asked each child questions about the name of family members, daily routines, or interests. For example, in a sample task in English, the tester asked the child, 'What did you have for breakfast? Following this, they asked the child, 'What is your mother's name?'

In Hindi, the equivalent task and procedure were used. Questions included 'आपकी माँ का नाम क्या है?' ('*What is your mother's name?*') and 'आप अपने दोस्त के साथ कौन सा पसंदीदा खेल खेलते हैं ?' ('Which favourite game do you play with your friend?').

4.7 Reading Measures

Reading measures developed for measuring the reading skills among young bilingual children.

4.7.1 Letter Knowledge Test

Rationale

Identifying letters has been widely used in early literacy assessment. Such a task has been also used in Book Buddies Early literacy screening (Johnston, Invernizzi, & Juel, 1998). This is because the ability to recognise letters is the initial stage of early literacy skills of children (Justice & Ezell, 2001). This measure was developed in Hindi and English for the current study based on regional language studies in primary schools (Nag, 2014).

Design

For pilot study 1, a Letter Knowledge measure was developed in Hindi and English for kindergarten children at a basic level of reading (Hindi aksharas and English alphabets). Initially, 18 items were selected in each language. These items were crosschecked with oral tests that had been conducted previously in school (these tests are conducted at the end of every month to see each child's progress). Based on the information of previous oral tests, letters A, C, and I were frequently correct, while G, M, R, Q, and W were mostly incorrect. The same

procedure was applied for the selection of Hindi aksharas. Through this process, the final number of letters was reduced to ten.

In English, LKG children were shown uppercase letters and UKG children were shown lowercase letters. According to the curriculum, the children would have learnt uppercase letters at the beginning of the school year, and therefore, would be familiar with reading uppercase letters. They would have learnt the lowercase letters later in the year. In this case, kindergarten children would be able to read uppercase and lowercase letters in English when the test was administered for this study. To test the difficulty level of items, it seemed preferable to give uppercase letters to LKG and lowercase letters to UKG. In the English language test, children in Grade 1 and Grade 2 were shown the picture of a number of objects and were asked to match the initial letter of each object with its picture. The questions for Grade 1 and 2 were taken from the activities that teachers gave at the end of a lesson (these activities were available in the course books), such as in English 'LOOK AT THE PICTURE AND MATCH IT WITH THE GIVEN LETTER'. Fourteen items were initially selected, and then reduced to 10 after considering the monthly tests (as was done for the LKG and UKG groups). Examples of this measure in Hindi with its English translation and examples in English are presented below.

Procedure

Because the children varied in age from LKG to Grade 2, the format of the tests was designed to be suitable for children of different grade levels. The different format are explained briefly in the subsequent sections.

<u>LKG (Lower Kindergarten)</u> Each child was shown four uppercase letters and asked to identify a particular letter by pointing to it. For example, the letters 'A', 'D', 'C' and 'E' were presented to the child and the tester said, 'Can you please find the letter D?' The child would respond by putting their finger under/on the letter D.

Unlike English, there are no uppercase and lowercase letters in Hindi. In this case, the tester showed the picture of Hindi aksharas; not necessarily in a series. Each child was asked to point at the picture of a Hindi akshara, such as ऐ (*ai)*, अ (a), आ (aa) (another form of *a*), and ख (*kha*). The tester asked the child, *'Can you please put your finger on अ (a)?'* The child would respond by putting their finger under/on the correct Hindi akshara. For LKG children, the selected aksharas were mostly Hindi vowels and initial consonants from 'Hindi Varnamala' (series of Hindi aksharas) because children are taught these first.

UKG (Upper Kindergarten) This measure was the same as for the LKG children, but the letters were lowercase rather than uppercase. The test was administered in the same way as for LKG children. The Hindi language measure used Hindi aksharas selected from the complete 'Varnmala' (initial to final aksharas), such as व (*va*), ब (*ba)*, भ (*bha)*, and म (*ma*).

Grades 1 and 2: The letter knowledge test was not assessed in the Hindi language, as it would have been too easy for these children.

For the English letter knowledge test, the tester showed the child the picture of three objects. They said a letter and asked the child to point to the picture of the object that began with that letter. For example, the tester said to the child, 'Can you please show me a picture that starts with the letter /B/ out of these three pictures?' The child would respond by pointing to the picture and naming the object. Figure 4.1 shows the pictures associated with this question.

Figure 4.1

Example for the Letter Knowledge test through pictures

1.   2.   3.
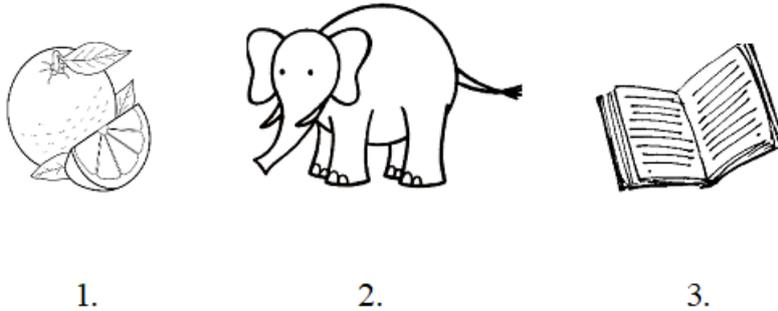
4.7.2 Print Concept (Print Awareness Assessment)

Rationale

This measure used in several studies (Ezell & Justice, 1998; Ezell, Justice, & Parsons, 2000; Justice & Ezell, 2000). Justice and Ezell (2001) stated the importance of print concept necessary for early literacy development in preschool children. Based on these studies, the Print concept measure developed to assess the participants' print knowledge as an indicator of early literacy development.

Design

This test intended to measure initial literacy of young children. This test was based on the Print Awareness subtest used by Justice and Ezell (2001). To the best knowledge, at the time the research carried out, there were no standardized Hindi measures available. As a result, based on the format and testing procedures of the English measure, the researcher selected and developed Hindi Print Awareness measure that was consistent with the purpose of the study. Ten questions developed for measuring the Print Awareness. The task included handling the

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Hindi and English main course books. Children pointed at identify book titles, letters, full stops, and the direction of reading through sliding finger from starting to end of a sentence in both Hindi and English. This test assessed lower grade children's (LKG and UKG) understanding of print knowledge.

Procedure

The Print Concept measure was an assessment of the children's awareness of features of a book. All children had the main English and Hindi course books with them. In this task, the tester said the title of a book aloud, showed the book to the child, and asked the child ten questions. The same questions and procedures were developed for the Hindi and English measures. For example, the tester asked, 'Can you show me the name of the book?' and the child was required to point to the title. In the Hindi language print concept test, the tester asked, 'क्या आप मुझे पुस्तक का नाम दिखा सकते हैं?' (*'Can you show me the name of the book?'*).

4.7.3 Single Word Reading Test

Rationale

The task used to assess the participants' reading ability and has been used by number of researchers in Hindi and English (Gupta, 2004; Gupta & Jamal, 2007; Vagh, 2012). Buly and Valencia (2002) used the similar task of word identification and stated that identification of words requires students to apply a number of strategies together, such as sound-symbol correspondences, structural analysis, letter patterns, and sight recognition of high-frequency word.

Design

This test required children to read words in Hindi and English. The difficulty level of each word was determined by analysing 16 tests from their course books: four in English and four in Hindi from Grade 1, and the same from Grade 2. A total of 26 words were selected for the first pilot study: 13 words from Grade 1 course books and 13 from Grade 2 course books in both languages. A teacher also provided input about which words would be too easy or too difficult for children. For example, the English words, APPLE, BELL, and SCHOOL were too easy for children, and the Hindi words, 'कबूतर' '*kabootar*' meaning pigeon, 'खरगोश' *'kharagosh'* meaning rabbit, were too easy. Therefore, the 20 most appropriate Hindi words and the 20 most appropriate English words were selected for the Single Word Reading Test.

Procedure

The examiner asked the student to read each word in the list aloud. The words read from top to bottom. The procedure for test administration were same in both the languages (Hindi and English). Examples of this measure in Hindi and English presented below with English translation.

Hindi Examples	English Examples
अनुभव 'anubhav' meaning 'experience'	Camel
क्षीण 'kshind' meaning 'weak'	Tree
नाटकीय 'naatakeeya' meaning 'theatrical'	Black
रास्ता 'raastaa' meaning 'way'	Chair

4.7.4 Akshara Recognition Test

Rationale

The Akshara Recognition Test was adapted from the experimental task of Nag (2014). This test used for measuring the reading ability of children in Hindi. The identification of Akshara has been argued to be evidence for literacy acquisition, especially for beginners (R. M. Joshi & McBride, 2019). With permission from the author (Nag, 2014), this measure was used in pilot study 1.

Procedure

The student asked to name 20 Aksharas orally. Practice with the first four akshara provided to ensure that the student understands the task. Examples include क, व, म (*ka, va, ma, respectively*).

4.8. Phonological Awareness Measures

For the measurement of phonological awareness in pilot study 1, the researcher developed four tests: rhyme awareness, two isolation tests (initial sound and final sound), and a sound deletion test in both Hindi and English.

4.8.1 Rhyme Awareness Test

Rationale

A study done by Gathercole, Willis, and Baddeley (1991) stated that the rhyme awareness scores were strongly related to scores on reading tests, at both ages 4 and 5 and also reflect the variance contributions to reading and vocabulary knowledge. Also, Melby-Lervåg (2012)

reported the correlations between rhyme awareness with reading in his study, the variability in correlations was significant. Therefore, in Pilot study 1, the rhyme awareness test were referred to as phonological awareness measure to find out the variability in word reading ability of children aged four to six years (LKG and UKG grades).

Design

Since a recognised standardised Rhyme Awareness measure was not available, this measure was developed by the researcher based on the phonological awareness assessment probes for preschool children used by Gillon (2005). In pilot study 1, the choice of words used in Rhyme Awareness for kindergarten children was based on the rhyming word activities given at the end of lessons in the Hindi/English course books. For example, a lesson in the English book, 'THE OLD OWL' was followed by an activity that instructed children to, *'Cross the words which do not rhyme'*. Twenty items were selected initially for Rhyme Awareness based on the school's previous oral test questions. The same criteria were used to identify and remove items that were too easy or too difficult. The final Rhyme Awareness measure had ten items in English and Hindi for LKG and UKG.

Procedure

The testers said three words clearly, with a brief pause between each word. They repeated the words and then asked the child to say the word that did not rhyme with the other two words. In an English example, the tester said, 'Can you please tell me which word does not match with the sound of the other two words?' The words are CAT, PAT, and DOG'. The tester repeated the question once more, and then the child would answer. 'DOG' was correct in this example.

The same question was asked in Hindi, 'क्या आप मुझे इन तीनों शब्दों में से एक ऐसा शब्द बता सकते हैं जो अन्य दो शब्दों की ध्वनियों के साथ मेल नहीं खा रहा है?' The words were 'अगर', 'मगर', 'नहीं' *'agar'* (if), *'magar'* (but), *'nahi'* (no). The correct answer was 'नहीं', *'nahi'* (no).

4.8.2 Sound Isolation Test (initial sounds)

Rationale

Children expected to isolate and pronounce the initial or final sound at phoneme level in sound isolation test. This test selected because it was considered reliable and suitable for determining the phonological processing among young bilingual children (Caravolas & Bruck, 1993; Caravolas, Volín, & Hulme, 2005; Hulme, Caravolas, & Brigstocke, 2005). This phonological awareness task based on the experimental probes used by Gillon (2007), which was adapted from Stahl and Murray (1994).

Design

Words from the course books and a few general words that children used almost every day were initially selected for the Initial Sounds measure at each class level. For example, 'Come' and 'Please' were daily routine words and were used by the children in oral language every day. The teachers advised that only a few children would recognise the /k/ sound of 'Come', although they would know the letter name. Some words, like 'Please', 'Speak', and 'Red' were of medium difficulty, and words like 'Pad', 'Sad' and 'Not' were too easy.

The Hindi word, 'राज्य' *('raajya' meaning* 'Kingdom') was a word of average difficulty; 'कृपया' *('krapaya'* meaning 'please') was more difficult because 'कृ' ('*kri'*) is a combinational

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letter formed by combining with the vowel 'ऋ' *('ri')*. Combinational letters are formed by combining a consonant 'क' *('k')* and a vowel 'ऋ' *('ri')*. 'क्' *('k')* + 'ऋ' *('ri')* = 'कृ'.

Fifteen items were initially selected for the Hindi measure and 15 items for the English measure. After the language teachers identified the sounds of letters children did not have experience with, ten items were finalised for each language measure. The teachers also suggested that this measure might be difficult in L2 English for younger kindergarten children because most of them might not be familiar with the sounds of the English alphabet at this stage of their learning. Therefore, LKG children were not assessed in the English language, but the suitability of the test for UKG children was investigated. The measure consisted of ten items in English for UKG to Grade 2, and ten items in Hindi for LKG to Grade 2.

Procedure

The child needed to say the first sound of each word said by the tester. The procedures for administering and scoring the test were the same for Hindi and English.

In an English example, the tester would say, 'In the word 'Mat', what is the first sound you hear'. The tester would repeat the word, and then the child would answer by saying the first sound they heard; the answer being 'm'.

In Hindi, the tester would say, 'इस शब्द के शुरुआत में आप कौन सी आवाज सुन रहे हैं?' ('What is the first sound you hear?') If the word was 'अजगर' *('ajagar'* meaning *'*python')) the child would answer with the first sound they heard, which was 'अ' (*'a')*.

4.8.3 Sound Isolation Test (final sounds)

Rationale

This phonological awareness task was again based on the assessment probe used in an experimental study by Gillon (2007) , with the Hindi measure being based on the English measure. Gillon (2007) found this assessment to be a valid and reliable measure in demonstrating the effectiveness of a phonological awareness intervention for six to eight years old children.

Design

The procedure for developing items for this measure was almost same as for Sound Isolation, (initial sound). For example, the words, 'Not', 'Sand', and 'Lamb' were of average difficulty, but words, like 'Watch' and 'Fish' were more difficult. In the Hindi language, words like 'जवान' (*'javaan'* meaning 'young'), 'पक्ष' *('paksh'* meaning 'side') were too easy, while words like 'पहले' (*'pahle'* meaning 'first') were difficult because the last letter is the combination of a consonant and a vowel. In this word, the vowel used is a diacritic sign of 'ए' (*'ae'*). With *'ae'*, 'े – ले' (*'lae'*) is a combination of 'ल्'+'ए' (*'l+ae'*). The character 'े' (*'ae'*) was added as a diacritic sign and the final sound would be 'ए' (*'ae'*). Again, after discussion with the language teachers, 18 words were selected for Sound Isolation (final sound). Because one language measure needed to be completed in one session with each child, it was preferable that there were not too many items in a test. The language teachers advised that the number of words should be reduced. Therefore, the final number of items was narrowed down to ten for both language measures. This measure was developed for Grade 1 and 2 children only.

Procedure

The child was required to say the last sound of each word spoken by the tester in Hindi and English. In an English example, the tester said, 'Tell me the last sound in the word "Hippo"', and the child was expected to state the last sound in the word, 'o'.

For the Hindi measure, the tester would say the Hindi word and ask the child 'इस शब्द के अंत में आप कौन सी आवाज सुन रहे हैं?' ('What is the last sound you hear at the end of this word?'). If the word was, 'तोता', then the answer would be **'आ'** ('*totaa*' meaning 'parrot') and the answer would be *'aa'*.

4.8.4 Sound Deletion Test

Rationale

Sound deletion Assessment Probe used by Gillon (2007) . This task is helpful to know the child's ability to recognize a missed phoneme from the word. The measure of Sound deletion also used by some researchers as Hindi phonological awareness measure (Chatterjee et al., 2014). Therefore, in this study, the test of Sound Deletion measured in order to determine the phonological awareness of the participants.

Design

Sound Deletion was based on the assessment probes used by Gillon (2007). There were 12 to 16 lessons or stories in Hindi and English course books with question activities after each lesson. For example, in the main English course book for Grades 1 and 2, the word 'Pink' was considered to be of average difficulty for Sound Deletion. About half of the children would be able to say that if the 'p' sound was removed from the word 'pink'. the new word would be

'ink'. For Hindi, an example from a Grade 2 Hindi book, lesson 1 was 'विनती' (*'vinatee'* meaning 'prayer'). In this lesson, there was a word 'स्वर' (*'svar'* meaning 'tone'). If the *'s'* sound was deleted, the new word would be *'var',* which was of average difficulty for Grade 1 and Grade 2 children. A total 14 words were selected for the first pilot study: seven items from the Grade 1 book and seven from the Grade 2 book in both languages. Previous academic tests were used to compare the difficulty level of items, and a final set of ten items were chosen for each language, with an equal number of words from grades 1 and 2.

Procedure

In Sound Deletion, the children were instructed to listen carefully to each word, after which the tester explained that they needed to remove the first sound of the word, and identify the word left.

For the English language, the tester would say the word 'Fox', and then say to the child 'Can you say the word without the sound of "f"?' The correct answer given by the child would be 'ox'.

For the Hindi language, the tester would say, 'क्या आप इस शब्द को बिना "उ" की आवाज के कह सकते हैं?' The tester could also have said, 'अगर हम *"उदार"* शब्द में से "उ" हटा देते हैं तो कौन सा नया शब्द बन जाएगा?' meaning 'Could you say this word without the sound of "u"?' or 'If we delete the sound of *"u"* from the word *"udaar"* then what new word would be formed?' If the word was 'उदार' (*'udaar'* meaning 'generous') then child needed to remove the sound of 'उ' (*'u'*), and give the answer 'दार' (*'daar').*

4.9. Morphological Awareness Measure

Carlisle (1995) suggest that **"**In the period when children are beginning to read and write (Kindergarten and Grade 1**),** they are typically in the final stages of mastering the inflections" (p. 194). Morphological awareness refers to children's "conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure" (Carlisle, 1995, p. 194). Several study reports of morphological awareness are associated with unique variance in reading skills in early elementary students to college students (Carlisle, 2000; Jarmulowicz et al., 2008; Kieffer & Lesaux, 2008; Liu & McBride-Chang, 2010).

4.9.1 Sentence Completion Test

Rationale

Sentence completion test used to measure children's English morphological awareness (Wolter et al., 2009). Implicit morphological awareness is demonstrated among preschool children by showing that they understand the aspects in which morphemes can be combined to convey meaning (Carlisle & Fleming, 2003). Awareness in morphology is necessary to improve a child's understanding of words that are the combination of meaningful elements (Nielsen, Luetke, & Stryker, 2011). Singson and colleagues (Singson et al., 2000) used a sentence completion measure designed to test morphological awareness with the use of derivations. The researcher developed this test to understand the participants' level of morphological understanding in both Hindi and English.

Design

The Hindi and English measures were developed in the same way, applying the rules of Hindi morphology. The items for this measure were based on the sentences available in the activities

given at the end of a story or lesson in the main Hindi and English course books, such as 'Complete the sentences with the correct options'. Sixteen sentences were selected for the first pilot study. To understand the difficulty level of each sentence, the five previous Hindi and English academic tests for each grade were considered. Four items were thought to be too easy for particular grade levels. Therefore, 12 items (six items from each grade) were selected for Sentence Completion. These items covered different grammatical distinctions: gender (masculine and feminine), person, number (singular and plural), prefixes, and suffixes.

Procedure

In pilot study 1, this measure was used for Grades 1 and 2 students. The tester read aloud an incomplete sentence, and the children had to choose an appropriate word from a set of options to complete the sentence.

In an English example, the tester would say, 'I am going to say a sentence here. Could you make the sentence complete with the help of options I will give you? You need to choose one correct option for the given sentence out of two'. Once the child was ready, the tester would say an incomplete sentence, such as 'My family has two --------'. The tester would give two options for the child to choose from; 'house' and 'houses'. The correct answer would be 'houses'.

The same method and instructions applied for the Hindi language. In a Hindi example, the sentence was 'मेरे दोस्त के पास दो -------- हैं।'; options would be 'कुत्ता' या 'कुत्ते' and the correct answer would be 'कुत्ते' indicating number (plural). The English translation is, 'My friend has two -------'. The available options would be '*dog*' *and* '*d*ogs' with the correct answer being 'dogs'.

4.10 Vocabulary Measures

The vocabulary measure is important because it helps both children and adults to read, write, and interact well. Vocabulary tests were also included in the analysis, as researchers such as (Nichols & Rupley, 2004) argue that mastery of vocabulary is a key feature of the ability to learn. In addition, it is important to have good vocabulary knowledge in L2 because it helps an individual to continue a conversation (Al-Khasawneh, 2012), and a better grasp of vocabulary knowledge can improve the ability of an individual to read in an L2 (Nichols & Rupley, 2004). Vocabulary helps in representing the academic achievement of children and adults (Naeimi et al., 2013; White et al., 1990).

4.10.1 PPVT-IV (Peabody Picture Vocabulary Test - IV) English Vocabulary

Rationale

PPVT-IV (Peabody Picture Vocabulary Test - IV) is a well-known test of receptive vocabulary that estimates verbal ability and linguistic knowledge. The test was originally developed by Dunn, Dunn, Bulheller, and Häcker (1965) but has undergone a range of revisions since that date. In India, PPVT has been used to assess Hindi speaking Kindergarten children by Kalia and Reese (2009). Kirby and colleagues (Kirby et al., 2012) used this test to measure children's verbal ability from grade 1 to 3.

Design

PPVT-IV (Dunn & Dunn, 2007) is a Standardised measure of receptive vocabulary for English. A color booklet is available for testing young participants.

Procedure

The examiner showed each participant with a set of images. There were four pictures on the one side of page. The examiner pronounced a word describing one of the images and the child asked to point towards the image identified by the word. The task used with each grade level of students. There were 12 items in one set and a maximum of five sets used for each participant. Only one set of 12 items used in Pilot Study 1 to comprehend the performance of children. Difficulty level increased with the age and grade to which each student belonged. Moreover, the first set given was the easiest, with difficulty level increasing in ascending order. Scores were awarded for correct/incorrect or no responses: 1 was given for correct and 0 for incorrect or no responses. For example, an examiner would ask a student; *'Can you show me an apple on this page?'* then child needed to put the finger on the picture of an apple.

4.10.2 Hindi Vocabulary Test

With the permission of Nag (2014), her unpublished Hindi vocabulary test was used to assess the children's knowledge of Hindi vocabulary in context. Nag had used this test with older children than the children examined in the current study. In this study, the test was given to children in Grades 1 and 2.

Procedure

The tester said a Hindi word and asked the child to talk about the meaning of the word. Twenty words were tested. For example, if the tester said the word 'ताला' (*'taala'* meaning 'lock')*,* the child might answer the Hindi equivalent of 'We lock the door with this' or 'Lock'. The Vocabulary measure was scored as follows: a score of three was given to an accurate definition; 'ताला' *('taala')* का अर्थ है एक बांधनेवाला जो दरवाजे या दराज से लगा हो उसे मजबूती से बंद रखें' *meaning* 'a lock means a fastener fitted to a door or drawer to keep it firmly closed'. The use

of a synonym 'बंद करना' (*'band karna'* meaning 'lock in'). A score of two would be given when the child used the word in a sentence; 'उन्होंने <u>ताला</u> लगा दिया' (*'Unhone taala laga dia'* *meaning* 'They locked the door'). A score of one was given to an answer that repeated the word with an inflection or used idiomatic phrases; 'ताले' (*'taale' meaning* 'lock') or 'तालों' (*'taalon'* meaning 'locks'). A score of zero was given to a wrong or no answer.

4.11 Pilot Study 1

The first pilot study aimed simply to gauge the reading abilities of children in the age range, making it easier to determine levels of complexity for subsequent pilots.

4.11.1 Participants

Participants for Pilot Study 1 were students in primary schools in Delhi. Twelve children selected (three children for each year group level). These participants were Hindi L1 and English L2 speakers.

4.11.2 Results

For the analysis, the Statistical Package for the Social Sciences SPSS version 4 used. Below are the results of the descriptive statistics of Pilot Study 1.

4.11.3 Descriptive Statistics across the different grades

Descriptive statistics (including means and standard deviations) across grades presented in this section. These results presented in Tables 4.2 to 4.6, followed by a discussion of these pilot results.

Table 4.2

Mean scores and standard deviations for the Language Understanding of LKG and UKG

	T. S.	Language Understanding	
		10	**10**
Grades		Hindi	English
LKG	Mean	5.66	5.33
N = 3	SD	1.154	3.785
UKG	Mean	7.66	7.00
N = 3	SD	1.154	1.000
Grade 1	Mean	-	-
N = 3	SD		
Grade 2	Mean	-	-
N = 3	SD		

Note: N=Number of students, T.S. = Total Score.

Table 4.2 shows that the mean scores on Understanding Language increased in order from LKG to Grade 2 in both the Hindi and English measures. Children had a better understanding in Hindi than in English.

Table 4.3

Mean scores and standard deviations for the reading measures for LKG to Grade 2 Groups: Letter knowledge, print awareness, single word reading, and akshara recognition.

Grades	T. S.	Letter Knowledge 10		Print Concept 10		Single Word Reading 20		Akshara Recognition 20
		Hindi	English	Hindi	English	Hindi	English	Hindi
LKG	Mean	7.33	10.00	8.00	6.33	-	-	-
N = 3	SD	0.577	.000	1.000	1.154			
UKG	Mean	9.00	9.66	6.66	6.66	-	-	-
N = 3	SD	1.732	0.577	0.577	1.154			
Grade 1	Mean	-	7.66	-	-	13.66	15.00	14.00
N = 3	SD		1.154			2.516	2.645	1.000
Grade 2	Mean	-	8.33	-	-	11.00	11.33	14.33
N = 3	SD		.577			4.358	4.041	3.214

Note: N=Number of students, T.S. = Total Score.

Table 4.3 shows that the mean scores for LKG and UKG children on the Letter Knowledge measure had a ceiling effect. The standard deviation for LKG English Letter Knowledge was zero meaning that the measure showed no variability; all children got the same score. Grade 1 children did better than that Grade 2 children in the Single Word Reading Tests. For the Hindi Print Concept, LKG children outperformed UKG children.

Table 4.4

Mean scores and standard deviations for the Phonological Awareness measures (Rhyme Awareness, Sound Isolation (initial and final sounds), and Sound Deletion) (LKG to Grade 2)

Grades		Rhyme Awareness		Sound Isolation (initial sound)		Sound Isolation (final sound)		Sound Deletion	
	T. S.	10		10		10		10	
		Hindi	English	Hindi	English	Hindi	English	Hindi	English
LKG	Mean	7.33	6.66	7.00	-	-	-	-	-
N = 3	SD	0.577	0.577	1.732					
UKG	Mean	8.33	9.66	6.66	8.33	-	-	-	-
N = 3	SD	2.081	0.577	.577	.577				
Grade 1	Mean	-	-	9.00	8.33	7.00	6.00	9.00	7.66
N = 3	SD			1.000	2.081	1.000	2.645	1.732	2.081
Grade 2	Mean	-	-	7.66	8.33	8.00	6.33	6.00	6.66
N = 3	SD			1.527	.577	2.000	1.527	1.000	2.081

Note: N=Number of students, T.S. = Total Score.

Table 4.4 shows that LKG children performed better than UKG children on Hindi Sound Isolation (initial sound). The mean scores on English Sound Isolation (initial sound) were the same for children from UKG to Grade 2. Grade 1 children performed better than Grade 2 children on Sound Deletion in both English and Hindi.

Table 4.5

Mean scores and standard deviations for the Morphological Awareness measure (Sentence Completion) (LKG to Grade 2)

		Sentence Completion	
	T. S.	12	12
Grades		Hindi	English
LKG	Mean	-	-
N = 3	SD		
UKG	Mean	-	-
N = 3	SD		
Grade 1	Mean	8.33	8.66
N = 3	SD	1.527	2.081
Grade 2	Mean	9.33	8.66
N = 3	SD	2.081	.577

Note: N=Number of students, T.S. = Total Score.

Table 4.5 shows the statistics for morphological awareness. The mean scores on Hindi Sentence Completion increased from Grade 1 to Grade 2 but on the English measure, they were the same. Children achieved higher scores than expected.

Table 4.6

Mean scores and standard deviations for the Vocabulary measures (Peabody Picture Vocabulary test and Hindi Vocabulary Test)

		PPVT	Hindi Vocabulary Test
	T. S.	12	60
Grades		English	Hindi
LKG	Mean	7.33	-
N = 3	SD	1.527	
UKG	Mean	9.66	-
N = 3	SD	1.527	
Grade 1	Mean	7.33	24.33
N = 3	SD	1.527	4.509
Grade 2	Mean	7.33	30.00
N = 3	SD	1.154	13.892

Note: PPVT=Peabody Picture Vocabulary Test, N=Number of students, T.S. = Total Score.

Table 4.6 presents the analysis of the Hindi and English Vocabulary measures. For the PPVT, the same mean scores and standard deviations were evident across school year groups except UKG. The items in Hindi Vocabulary were too difficult for Grades 1 and 2 children. This may have been due to the children in the Nag (2014) study being older than those in this current study.

4.11.4 Analysis of the Results

The results of this pilot study showed that most children achieved higher scores than expected. This may have been because the children were academically able. LKG and UKG children were familiar with letter names and showed little variability. The measures of Akshara Recognition and Hindi Vocabulary were too difficult for the targeted children, and therefore

would not be useful in the next pilot study. For some measures there was no variability in the scores; all children scored the same. However, in order to investigate the measures further, all the measures except the Akshara Recognition and Hindi Vocabulary were used again with a larger sample of 40 children in the second pilot study. The small sample in the first pilot study may have been the reason for problems with the measures.

4.12 Pilot Study 2

After evaluating the results from the first pilot study, changes were made to the measures for implementing in the second pilot study. The number of children was increased to improve the interpretation of result. For the second pilot, it was important to looking for the variability in scores, because the measures should not produce the same score for all children. It was essential that the measures were not too simple, with everyone receiving the maximum possible score, or too difficult, with everyone receiving the lowest possible score.

4.12.1 Changes for Pilot Study 2

In the second pilot study, 20 measures were used: ten for English and ten for Hindi. Children in LKG, UKG, Grade 1 and Grade 2 were used again. The PPVT (Peabody Picture Vocabulary test) procedures were revised so that five sets of 12 items (instead of one set) were used. This increased the number of items 60 for each grade level. A measure of Hindi Vocabulary (Story Retelling) was developed for LKG to Grade 2. The remainder of the measures from the first pilot study were retained for the second pilot study (see section 4.11). Table 4.7 presents all the measures of Hindi and English used in the second pilot study.

Table 4.7

Table of Hindi and English Measures for Pilot Study 2

	Measures	Sub-tests	Grade Level	No. of Items
	Language Understanding	1. Language Understanding	LKG & UKG	10
	Reading	2. Letter Knowledge	LKG & UKG	10
		3. Print Concept	LKG & UKG	10
		4. Word Reading	Grade 1 & 2	20
	Phonological Awareness	5. Rhyme Awareness	LKG & UKG	10
		6. Isolation (Initial sound)	LKG to Grade 2	10
		7. Isolation (Final sound)	Grade 1 & 2	10
		8. Sound Deletion	Grade 1 & 2	10
Hindi				
	Morphological Awareness	9. Sentence Completion	Grade 1 & 2	12
	Vocabulary	10. Story Retelling	LKG to Grade 2	10
	Language Understanding	1. Language Understanding	LKG & UKG	10
	Reading	2. Letter Knowledge	LKG to Grade 2	10
		3. Print Concept	LKG & UKG	10
		4. Word Reading	Grade 1 & 2	20
English	Phonological Awareness	5. Rhyme Awareness	LKG & UKG	10
		6. Isolation (Initial sound)	UKG to Grade 2	10
		7. Isolation (Final sound)	Grade 1 & 2	10
		8. Sound Deletion	Grade 1 & 2	10
	Morphological Awareness	9. Sentence Completion	Grade 1 & 2	10
	Vocabulary	10. English Vocabulary	LKG to Grade 2	60

4.12.2 PPVT-IV, English Vocabulary

For rationale, design and example see section 4.10.1.

Procedure

The examiner showed each participant a set of pictures. There were four pictures on the one side of page. The examiner pronounced a word describing one of the pictures and the child asked to point at the picture identified by the word. The task was used with each grade level of students. There were 12 items in one set and a maximum of five sets used for each participant. In pilot study 2, five sets with 60 items (12 items in each set) were used. Difficulty level increased with the age and grade to which each student belonged. The first set given was the easiest, with difficulty level increasing in ascending order.

4.12.3 Story Retelling Assessment

Rationale

Story retelling encouraged children to examine stories and construct oral language as they acquire similar vocabulary (Scheinkman, 2004). Story retelling is characterized as post-reading and post-listening, with reminders used to convey what has been learned or remembered (Morrow, 1996). Since retelling involves the organizing of thoughts (Goodman, 1982; Pappas & Pettegrew, 1991), it provides the instructor with useful information on the oral composition of students and vocabulary knowledge (Roberts, Good, & Corcoran, 2005). Story retelling not only builds an understanding of the story, but also reveals what the listener or reader understands and recalls (Gibson, Gold, & Sgouros, 2003). Therefore, story retelling is an essential tool to develop the oral language and vocabulary (Anderson, Valerie, & Roit, 1998). Story retelling measures children's organisation and descriptions of an event. In this

study, these organisational and descriptive skills show children's knowledge level of Hindi vocabulary.

Design

The Hindi Vocabulary Knowledge measure involved children retelling a story; the same story was used for all grade levels. The choice of story was discussed with the Hindi language teachers because they taught Hindi language across several years and would be able to determine whether the story would be suitable and known/unknown for children across all the grades. Based on the discussion, one story from the school library was selected. Children's performance on classroom storytelling assessments were also discussed with the Hindi language teachers. It was important to record the children's responses accurately, by writing the responses down or typing them exactly as the child retold the story so that their spoken Hindi could be analysed in terms of vocabulary use.

Short story in Hindi – The Rabbit and the Turtle (English translation)

A day, a rabbit boasted about how quick he could run. For being so slow, he laughed at the turtle. The turtle then challenged the rabbit for a race after hearing this. They started racing to see who would be quicker. The rabbit raced way ahead of the turtle as the race began, just as everyone was hoping. The rabbit turned to see if the turtle could be reached, and found him far behind. As the turtle was really slow, the rabbit decided to rest and take a quick nap. As the rabbit slept under a tree, the turtle, with its steady speed, raced to the destination. Even with its slow speed, as the rabbit slept, turtle finished the race, the turtle raced to its destination. He was unable to see the turtle around! He went to the finish line at full speed, but found the turtle waiting for him there. The moral of the story is; We should never underestimate a weak person.

Procedure of test administration and marking

The tester read the story to a child, who then retold the story in its own words. The tester recorded accurately on paper what the child said for later analysis. Points were then given based on how many details the child told correctly. The highest possible score was ten.

The scoring system for each element and the points given were as follows:

Story names the main character (two points)

Story includes important events in the story (All=4, Most=3, Few=2, Attempted=1)

Story is told in sequence (Yes=3, Partially=2, Attempted=1)

States the story theme or moral (one point)

For wrong and no answers (zero points)

Story Retelling was a common form of school assessment, and children and testers were familiar with points being assigned this way.

4.12.4 Descriptive Statistics across the different grades

For pilot study two, descriptive statistics presented in Tables 4.8 to 4.12, followed by a discussion of these pilot results.

Table 4.8

Mean scores and standard deviations for the Language Understanding (LKG and UKG)

		Language Understanding	
	T. S.	**10**	**10**
Grades		Hindi	English
LKG	Mean	7.10	3.45
N = 10	SD	.737	2.544
UKG	Mean	7.20	5.30
N = 10	SD	.788	1.251
Grade 1	Mean	-	-
N = 10	SD		
Grade 2	Mean	-	-
N = 10	SD		

Note: N=Number of students. T.S. = Total Score.

Table 4.8 indicates that the mean scores were in an appropriate order from Grade 1 to Grade 2.

Additionally, children's understanding of L1 is higher than L2.

Table 4.9

Mean scores and standard deviations for the reading measures (letter knowledge, print awareness, and single word reading) (LKG to Grade 2)

		Letter Knowledge		Print Concept		Single Word Reading	
	T. S.	10		10		20	
Grades		Hindi	English	Hindi	English	Hindi	English
LKG	Mean	7.80	8.09	7.40	4.09	-	-
N = 10	SD	1.032	2.879	1.429	2.165		
UKG	Mean	8.80	9.80	8.00	6.30	-	-
N = 10	SD	1.475	0.421	1.563	1.337		
Grade 1	Mean	-	7.70	-	-	14.30	16.60
N = 10	SD		1.251			2.311	1.577
Grade 2	Mean	-	7.90	-	-	14.80	12.33
N = 10	SD		.875			2.936	2.451

Note: N=Number of students. T.S. = Total Score.

Table 4.9 shows that the mean scores in English Letter Knowledge and Word Reading Tests were not in appropriate order (lower grade children achieved higher scores than the higher grade children) as expected for this study.

Table 4.10

Mean scores and standard deviations for the Phonological Awareness measures (Rhyme Awareness, Sound Isolation (initial and final sounds), and Sound Deletion) (LKG to Grade 2)

Grades		Rhyme Awareness		Sound Isolation (initial sound)		Sound Isolation (final sound)		Sound Deletion	
	T. S.	10		10		10		10	
Grades		Hindi	English	Hindi	English	Hindi	English	Hindi	English
LKG	Mean	7.00	5.45	5.10	-	-	-	-	-
N = 10	SD	1.414	2.067	2.330					
UKG	Mean	8.00	7.70	7.60	6.10	-	-	-	-
N = 10	SD	1.563	1.337	2.270	1.595				
Grade 1	Mean	-	-	8.70	7.80	7.70	7.60	7.20	8.10
N = 10	SD			1.251	1.813	1.337	1.897	1.032	1.728
Grade 2	Mean	-	-	9.00	8.20	8.70	7.70	8.00	8.40
N = 10	SD			1.563	1.475	1.636	2.162	2.211	1.074

Note: N=Number of students. T.S. = Total Score.

In Table 4.10, the scores of the measures increased from the lowest grade level to the highest. However, most of the tests' scores showed near-ceiling effects.

Table 4.11

Mean scores and standard deviations for the Morphological Awareness measures (Language Understanding and General Morphological Awareness) Grade 1and Grade 2)

		Sentence Completion	
	T. S.	12	12
Grades		Hindi	English
LKG	Mean	-	-
N = 10	SD		
UKG	Mean	-	-
N = 10	SD		
Grade 1	Mean	9.60	8.90
N = 10	SD	1.074	1.370
Grade 2	Mean	9.00	8.90
N = 10	SD	1.699	1.852

Note: N=Number of students. T.S. = Total Score.

According to Table 4.11, the mean score for Grade 1 children on Hindi Sentence Completion was higher than for Grade 2 children. On English Sentence Completion, the mean scores for Grades 1 and 2 were the same.

Table 4.12

Mean scores and standard deviations for the Vocabulary measures (Peabody Picture Vocabulary Test and Hindi Vocabulary Test)

		PPVT (English)					Story Retelling (Hindi)
	T. S.	12	12	12	12	12	10
Grades		Set 1	Set 2	Set 3	**Set 4**	**Set 5**	
LKG	Mean	7.72	6.81	5.27	**2.72**	**.27**	6.10
N = 10	SD	2.796	2.750	2.053	**1.902**	**.646**	1.197
UKG		Set 2	Set 3	**Set 4**	**Set 5**	Set 6	
N = 10	Mean	7.60	7.00	**4.10**	**2.40**	.60	6.70
	SD	1.429	2.581	**2.024**	**2.590**	.966	1.418
Grade 1		Set 3	**Set 4**	**Set 5**	Set 6	Set 7	
N = 10	Mean	7.40	**6.50**	**5.70**	4.20	1.10	8.60
	SD	1.264	**1.957**	**1.828**	1.932	.875	.966
Grade 2		**Set 4**	**Set 5**	Set 6	Set 7	Set 8	
N = 10	Mean	**6.80**	**6.90**	5.90	3.80	.90	8.20
	SD	**1.619**	**2.282**	1.523	1.988	.875	2.043

Note: PPVT=Peabody Picture Vocabulary Test, N=Number of students, T.S. = Total Score.

In Table 4.12, sets 4 and 5 highlighted because these sets were common across each grade level. From LKG to Grade 2, the mean scores for sets 4 and 5 were increasing in order of grade levels suggesting that the measure has discriminating ability levels appropriately. On the other hand, in the Story retelling test (Hindi), Grade 1 achieved a higher average score than Grade 2.

4.12.5 Analysis of the Results

The responses from the second pilot study are presented in Tables 4.8 to 4.12. As can be seen, responses showed some level of variability across the school grades tested, but for some tests, the mean score for children in the lower grades was higher than that for children in the higher

grades. Other tests showed mean scores near to the maximum possible score, indicating ceiling effects. This may have been due to practice effects because some children from pilot study 1 were re-assessed in pilot study 2. Therefore, for the next pilot study, it was important to use different children, make specific changes to some items, and change a particular measure. Some measures were reviewed, and new words were added and arranged according to their increased level of difficulty in both Hindi and English languages. These revised measures were trialled in the third pilot study.

4.13 Pilot Study 3

A number of changes were made to the third pilot study based on the findings from the previous one.

4.13.1 Participants

A different group of 20 children were selected for the third pilot study to avoid any practice effects. There were five children at each grade level (LKG to Grade 2) selected from three different schools. These children were assessed at their own school during school hours. The testing procedures were the same as previous pilot studies.

4.13.2 Changes for Pilot Study 3

Several measures were not administered in the third pilot study as the previous trials had shown they were operating as they should be: increasing mean scores with grade level and adequate variability in scores. These included Letter Knowledge, Print Concepts, and Rhyme Awareness for LKG and UKG. The Language understanding test not administered in pilot study 3 because the result showed that the understanding of language of Kindergarten children were in appropriate order and student achieved higher scores in L1 Hindi in comparison to L2 English.

The newly developed Single Word Reading Test was administered to LKG and UKG as a replacement for the Print and Letter knowledge. For Grades 1 and 2, Hindi and English Sentence Reading were developed to increase the difficulty level and to introduce some score variability.

Additional measures of English phonological awareness were developed; Sound Blending for LKG and UKG, and Sound Substitution for Grades 1 and 2. Two new morphological awareness measures, Base Word and Word Structure in Hindi and English, were developed for Grade 2 and Grades 1 and 2, respectively. These new measures are described in the following sections.

Hindi phonological awareness measures, Sound Isolation (initial sound), Sound Isolation (final sound), and Sound Deletion were administered at LKG to Grade 2. Although, English phonological measures, Sound Isolation (initial sound), and Sound Isolation (final sound) were administered at UKG, Sound Deletion was administered at Grade 1 and Grade 2. The same English and Hindi Vocabulary measures were used in second pilot study. Table 4.13 presents all the measures with the number of items and the grade levels they were administered to.

Table 4.13

Table of Hindi and English Measures for Pilot Study 3

	Skills	Sub-tests	Grade Levels	No. of Items
Hindi	Reading	1. Word Reading	LKG & UKG	10
		2. Sentence Reading	Grade 1 & 2	15
	Phonological Awareness	3. Isolation (Initial sound)	LKG to Grade 2	10
		4. Isolation (Final sound)	LKG to Grade 2	10
		5. Sound Deletion	LKG to Grade 2	10
	Morphological Awareness	6. Sentence Completion	Grade 1	15
		7. Base Word	Grade 2	10
		8. Word Structure	Grade 1 & 2	10
	Vocabulary	9. Story Retelling	LKG to 2	10
English	Reading	1. Word Reading	LKG & UKG	10
		2. Sentence Reading	Grade 1 & 2	15
	Phonological Awareness	3. Isolation (Initial sound)	UKG	10
		4. Isolation (Final sound)	UKG	10
		5. Sound Deletion	Grade 1 & 2	10
		6. Sound Blending	UKG & Grade 1	10
		7. Sound Substitution	Grade 1 & 2	10
	Morphological Awareness	8. Sentence Completion	Grade 1	15
		9. Base Word	Grade 2	10
		10. Word Structure	Grade 1 & 2	10
	Vocabulary	11. English Vocabulary	LKG to Grade 2	60

4.13.3 Single Word Reading Test

LKG and UKG children were expected to read two- to four-letter Hindi words, and words with

the diacritic sign of 'आ' (*'aa'*), 'इ' '*I*', and 'ई' (*'ee'*) by the time of data collection for the main

study. Children were also expected to read a few 2- and 5-letter English words. Therefore,

Hindi and English Word Reading Tests were developed for LKG and UKG. The rationale and

procedure were the same as the Single Word Reading measures described in the first pilot study (section 4.7.3).

Design

The choice of words to be used in the Single Word Reading Test was based on the main Hindi and English course books, previous monthly oral tests of Hindi and English language. The Hindi English language teachers were satisfied with the selection of words, but gave some suggestions. For example; kindergarten children used some specific words for learning the English alphabet, like A for APPLE, B for BAT, and C for CAT. In addition, children learnt the Hindi aksharas through a few fixed words, such as 'अ'('a') for 'अनार' ('pomegranate'), 'आ' ('*aa*' for 'आम' ('mango'), 'इ' ('*i'*) for 'इमली' (tamarind), 'ई' ('*ee'*) for 'ईख' (reed). Most children were familiar with these words and so they would be less difficult. English words like 'Frog', 'Boat', and 'String' were difficult words for them to read based on the monthly test results. Sixteen items were selected for the test initially but six items were deemed too easy or too difficult when compared with the results of previous monthly oral tests. Hence, the final measures included ten items in Hindi and ten in English. The English words 'cat' or 'dog' were too easy and 'shine' or 'Cheer' were too difficult. The Hindi words like 'आम' ('*aam*' meaning 'mango') or 'इमली' ('*imalee'* meaning 'tamarind') were too easy, while 'महीना' ('*maheena'* meaning 'month') or 'पपीता' ('*papeeta'* meaning 'papaya') were too difficult. Below are the examples of Hindi and English words.

Hindi	English
रथ *'rath'* meaning 'chariot'	Hot
काम *'kaam'* meaning 'work'	Lion
मछली *'machhalee'* meaning 'fish'	Kite

4.13.4 Sentence-reading Test

Rationale

This test developed for Pilot 3 to measure the reading ability of Grade 1 and 2 learners. Such tests have been used previously to assess children's reading progress. For example, the Salford Sentence Reading Test (SSRT), restandardised by McCarty and Lallaway (2012), first published in 1976 to measure the reading ability of pupils who have English as their second language. Nathan and Kahaner (2012) to measure the reading ability of children have also used this type of measure.

Design

Sentence Reading consisted of reading 20 sentences. The sentences were based on the reading material available in the main Hindi and English course books at Grades 1 and 2. To ensure the sentences were appropriate for the grade levels, 16 previous test papers were examined. On the advice of the Hindi and English language teachers, five sentences were deleted. Fifteen sentences from each language were confirmed for assessing the reading ability at Grade 1 and Grade 2. This created a test for both languages that reflected the curriculum standards appropriate for the children's ages.

Procedure

The tester showed the children the 15 sentences. The tester then asked the child to read each sentence clearly and aloud. The procedures for test administration and scoring were the same in both languages.

An English example was, 'I was playing football'. An Hindi example was, 'गोटू व मोटू की आँखें खुशी के कारण चमकने लगीं।' (*'Gotu va Motu kee aankhen khushee ke kaaran chamakane lageen'* meaning 'Gotu and Motu's eyes began to glow with happiness').

4.13.5 Sound Isolation (initial sound) Test

The rationale and procedure were the same as described in Pilot study 1 (for details see section 4.8.2).

Design

In pilot study 3, Sound Isolation (initial sound) was used for LKG to Grade 2 with more difficult replacement words added. There were two sets of items in Hindi: one set for LKG and UKG, and a more difficult set for Grades 1 and 2. The words for LKG and UKG started with a Hindi vowel, and the words for Grades 1 and 2 started with either a Hindi vowel or a Hindi consonant to increase the difficulty level of words. For example, 'औरत' (*'aurat'* meaning 'woman') starts with 'औ' (*'au')*, which is a Hindi vowel, and 'श्वेत' (*'shvet'* meaning 'white') starts with a consonant combination of 'श्' (*'sh'*) and 'व' *('va')*, which form 'श्व' (*'shva')* and the initial phoneme sound is *'sh'*. For LKG and UKG, the words that started with a complete Hindi consonant were replaced with words that started with Hindi vowels. For example, 'जवान' (*'javaan'* meaning 'young') was replaced with 'ओखली' (*'okhali'* meaning 'mortar'). The

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previous pilot studies had shown that words starting with a vowel were of average difficulty, while words starting with a single consonant (without any combination of other consonants or vowels) were easy and displayed a ceiling effect.

The English measure was only administered at UKG to see whether it could work at LKG. Care was taken to determine the difficulty level for items to avoid a ceiling effect; so that easier items were replaced with more difficult ones. For example, the word 'flood' was too easy and was replaced with 'photo'. However, 'photo' starts with the letter 'p', but sounds 'f'; therefore, it could be more difficult for children to tell the first sound. The number of items in the test was same (10).

4.13.6 Sound Isolation (final sound) Test

The rationale and procedure were the same as described in Pilot study 1 (for details see section 4.8.3).

Design

In the third pilot study, this test was administered at LKG and UKG in the Hindi language. The items were based on the main Hindi course book and routine daily words. For example, from a Hindi book, 'कबूतर' (*'kabootar' meaning* 'pigeon'), and a daily routine word 'चाचा' (*'chacha' meaning* 'uncle'). The items with high mean scores in previous pilot studies were also used at LKG and UKG, such as 'तोता' (*'tota'* meaning 'parrot'). The few words that were too difficult in previous pilot studies were used at Grades 1 and 2. For example, 'कूदना' ('*koodanaa'* meaning 'to jump'). Most new words selected ended with a vowel sound in order to make them more difficult. For example, 'उल्' (*'ulloo'* meaning 'owl'), ends with 'ऊ', the *'oo'* sound. This Hindi vowel is used here as diacritic sign with 'ल्' (*'l')*. With *'oo'*, 'ू–लू

('loo') is a combination of 'ल्+ऊ' (*'k+oo'*). The character ु added below. There were 10 items for all groups.

4.13.7 Sound Deletion Test

The rationale and procedure were the same as described in Pilot 1 (for details see section 4.8.4).

Design

There were two sets of ten Sound Deletion items; one was used with LKG and UKG, and other was used with Grades 1 and 2 in Hindi. The English Sound Deletion was only used at Grades 1 and 2. If the LKG children performed better in the Hindi Sound Deletion, then an English measure might also be used. New items replaced the very easy and very difficult items. The very easy Hindi language words at Grade 1 and 2 were used at LKG and UKG. An example in Hindi was 'स्वर' (*'svar' meaning* 'vowel or gamut'). It was quite easy at Grades 1 and 2, so it was used at LKG and UKG. At LKG and UKG, only initial sounds were deleted from words while at Grades 1 and 2, the sound deleted could be initial, medium, or final sounds. Given that, at LKG and UKG, most words were taken from the previous test used at Grades 1 and 2 in Hindi and English. Based on the results of previous pilot studies, the words had consonant combinations, were more difficult than the simple vowels and consonants words. After deleting selected sounds, all of the words were meaningful words. For example, 'द्वार' ('dvâr' meaning 'gate'). 'द्व' (*'dva'*) has the consonant combination of 'द्' (*'d'*) and 'व' (*'va'*). If the sound of 'द्' (*'d'*) was deleted, then the new word would be 'वार' (*'vaar'* meaning 'day'). In English at grades 1 and 2, the words with high mean scores were replaced with words that started with consonant clusters. For example, 'phone' replaced 'side'.

4.13.8 Sound Blending Test

Rationale

To measure phonological awareness of kindergarten children, many researchers in English language (Daly, Chafouleas, Persampieri, Bonfiglio, & LaFleur, 2004; Høien, Lundberg, Stanovich, & Bjaalid, 1995) have used Sound Blending test. Sound blending is one of the easier phonological awareness tasks for young children (Perfetti, 1985), yet blending reveals the theoretical nature of reading. Even if a child may know the individual sounds of letters in the word mat, blending those sounds together involves more attention than saying the word's name (Liberman & Liberman, 1990). There are the number of tests available that designed to assess a student's ability to blend the sounds of letters into a word, including Illinois Test of Psycholinguistic Abilities (S. A. Kirk, McCarthy, & Kirk, 1968; Roswell & Chall, 1997).

Design

Before the test, the child should have some background knowledge about the test items. A particular child may not know much about the items used in the measures. It is worthwhile to assess the relevant information of items used in the measures before expecting a child to be able to accomplish the test. The children needed to have some background knowledge about the test items before being assessed. In the process of selecting items for Sound Blending from the words available in English language course books, the items were considered in terms of their familiarity and difficulty. Children completed activities from their course books, such as 'READ ALOUD AND COMBINE THE SOUND OF GIVEN LETTERS'. Thirteen items were selected; 'f-a-t' or 't-e-n'. Three items were deleted because they were too easy (c-a t). Ten items were used in English at UKG and Grade 1 to see whether this test would be suitable for children aged five to seven years old. Depending on the results of the pilot study, it would be

decided if the test could be administered at LKG in both languages. Care was taken to ensure that the items were not too difficult for UKG or too easy for Grade 1.

Procedure

The tester pronounced the individual sound of each letter in a particular word and the child was asked to blend the sounds to form a complete word. For example, if the sounds were 'l-i-p' then the child's response should be 'lip'.

4.13.9 Sound Substitution Test

Rationale

Sound substitution has been used widely in English to assess children's phonological skills (Bialystok, 2001). This task measures the ability of identify and relocate the sound of individual letters in a particular word (Koda, 1998). In previous studies, sound substitution has been used with bilingual children (Wallach & Wallach, 1976; Williams, 1980) to measure phonological awareness. Sound substitution measures have been used as Hindi phonological measures to assess the children's learning development (Chatterjee et al., 2014).

Design

Sound Substitution was developed for Grade 1 and 2. Sixteen items were selected from the main English course books for these grades. To determine the difficulty of these items, children's performance on the previous eight test papers (four from each grade) were used. Examples of moderately difficult words were 'shop and chop' or 'fish and fin'. The number of items was narrowed down to ten by removing very easy words, such as 'dig and pig'. Out of the ten words, five words had beginning sounds to be deleted and five words had ending sounds to be deleted.

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Procedure

For this measure, ten items were developed in English a Grades 1 and 2. Depending on how well this measure worked, a parallel test would be developed for Hindi. The tester would say a word, and the child had to remove the first sound of the word and replace it with another sound to form a new word. The children had to mentally substitute the given sound and say the new word. For example, the tester would say, 'What word do we have if we change the 'sh' in <u>sheet</u> to 'f'?' The answer would be 'feet' (beginning sound). 'What word do we have if we change the 'sh' in <u>fish</u> to 'n'?' The answer would be 'fin' (ending sound).

Five measures of phonological awareness in each language were chosen to assess children's knowledge of sound: Sound Isolation (initial sound), Sound Isolation (final sound), Sound Deletion, Sound Blending, and Sound Substitution.

4.13.10 Sentence Completion Test

For Pilot 3, the number of items in this measure increased to 15 items from the 12 items used in previous pilot studies. The aim was to increase the difficulty level of the task. Given that, the added three new items were slightly difficult in comparison to other 12 items. These three items added on the suggestion of language teachers to increase the difficulty level of test. Selected items based on the activities available at the end of chapter. Examples of such items include: My friend couldn't walk because he fell --------------. (Tomorrow/yesterday), The lion roared at the man----------- (loudly/softly) The crow -----------in the sky. (Moves/flies). This measure administered with Grade 1 children to see whether this measure can reduce the ceiling effect in the third pilot study, and whether this measure could be used for lower grades or need to be removed from the list of morphological measures. The method of administration and scoring was same as previous pilot studies (for detail see section 4.9.1).

4.13.11 Base Word Test

Rationale

The test of base words used by researchers in English to assess the morphological awareness of children in the early years of schooling (Carlisle, 1995). Carlisle (2000) used a similar task in which children had to identify the correct root morpheme of a given word. This test assesses the participants' awareness of the morphological relations between the base/root and derived parts of words (Carlisle, 2000). In pilot study 3, two measures were developed; Base Word and Word Structure. The measure of Base Words should assess the students' base morpheme awareness, while Word Structure measure should assess the students' awareness of the morphological structure of a word. In the current study, the Base Word test used to assess the participant's knowledge of root or base words. However, three measures of morphological awareness in each language (Hindi and English) were selected based on the objectives of the study and referred to as Sentence Completion, Base Word and Word Structure. These assessments have been used with children, adolescents, and adults in the existing literature.

Design

The Hindi and English Base Word measures were equivalent in format, procedures and scoring. The main Hindi and English language course books were used to guide the development of both tests. For example, the seventh chapter of the English Grade 2 main course book, 'The Please Police', had an activity involving joining words with suffixes to create words like 'biggest' (big-est'), 'shorter' ('short-er'), or 'lovely' ('love-ly'). In the Hindi course book *'Hamari Rashtra bhasha Hindi'*, the ninth lesson was कछुआ और गिलहरी *('KACHHUA AUR GILAHAREE' meaning* 'TURTLE AND SQUIRREL'). In this lesson. the word 'ललचाया' *('lalchaya' meaning* 'tempted') was used. This word was derived from 'लालच' *('laalach'*

meaning 'greed'). Another lesson, 'जल देवता', *('Jal Devta' meaning* 'GOD OF WATER'), used the word 'मछलियों' (*'machhaliyon'* meaning 'fishes') derived from 'fish'. Therefore, children were aware of these types of activities involving words with suffixes in both Hindi and English. However, the question was whether they knew the root/base words. The initial selection of 13 items in each language, were narrowed down to ten on the advice of the language teachers; They thought three words were too difficult and were removed. An example in English was 'assessable', and in Hindi 'नियमितता *('niyamitataa' meaning* 'regularity').

Procedure

These measures were administered at Grade 2 to determine their level of difficulty. Each word comprised a suffix, and the task was to identify the base/root form of the word.

For example, in English, the tester would say, 'Could you please tell me the base word of greenish?' and the expected answer would be 'green'. In Hindi, the tester would say 'क्या आप मुझे 'असरदार' शब्द का आधार शब्द बता सकते हैं?' and the expected answer was 'असरदार' (*'asardaar' meaning* 'effective') = 'असर' *('asar' meaning* 'effect').

4.13.12 Word Structure Test

Rationale

Several researcher for measuring morphological awareness (McBride–Chang et al., 2005) assess children's knowledge of word structure. The Word Structure analysis also known as the 'comes from' test and used in a variety of morphological assessments in the reading researches (Berko, 1958; Curinga, 2014; Mahony, Singson, & Mann, 2000). This test evaluates the understanding of the morphological structure of words by the participants (Carlisle, 2000),

which is one type of morphological knowledge (Tyler & Nagy, 1989). Feldman and Andjelković (1992) points out that this test can be used to evaluate the students' awareness of morphological relations between words and their internal morphological forms. Morphemes indicate word characteristics (connection between root/base words and derived words). The knowledge of these characteristics (internal word structure) can facilitate the ability to read. The rationale for selecting the particular morphological task implemented, is that the reading and understanding the words and should be supported by an awareness of these inner components of words, and the ability to assess the constituent morphemes.

Design

Word Structure was constructed for this study by the researcher in Hindi and English to measure children's word structure knowledge. The reading materials from the main Hindi and English course books, and daily-routine words were used to develop this measure. They were discussed with classroom teachers and language teachers. These included daily routine words like 'breakfast' and 'worksheet'. In the main English course book, the chapter, 'THE LADY WITH THE LAMP', used the word 'childhood'. English language teachers advised that the majority of children should be able to separate the word 'childhood' into 'child' and 'hood'. For the Hindi language, the lesson, 'खेल भावना', *('khel bhaavna')* used the word 'आश्चर्यचकित' *('aashcharyachakit' meaning* 'surprised') with an average difficulty level, and could be divided in two words *'aashcharya'* (meaning 'surprise') and *'chakit'* (meaning 'confounded'). Experienced language teachers believed that the children should be able to recognise the word structure and this measure was piloted in the third pilot study. The same format and procedures were used for Hindi and English, and initially comprised 15 items in each language for Grades 1 and 2. Five very easy words were eliminated, such as 'lunchbox' and 'goodbye', and in Hindi,

'राजकुमार' (*'rajkumaar'* meaning 'prince') and 'बैलगाड़ी' (*'bailgaadi'* meaning 'bullock cart').

Ten words were used in the test piloted.

Procedure

Students were asked to divide a given word into two meaningful words. For example, in English, the tester would verbally present the word, 'breakfast', and ask the child, 'Could you please divide the word 'breakfast' into two words?' The expected response was 'break' and 'fast'. In Hindi, the tester asked 'क्या आप "<u>जन्मदिन</u>" शब्द को दो शब्दों में बाँट सकते हो?' ('Can you divide the word *'janmadin'* into two words?'. The correct answer was 'जन्म' ,(*'janm'* *meaning* 'birth') and 'और 'दिन' ('*din'* *meaning* 'day').

4.13.13 Descriptive Statistics across the different grades

Descriptive statistics calculated from the participants across grades presented in this section, which provides the mean and standard deviation. These results are in Tables 4.14 to 4.17 and followed by the discussion.

Table 4.14

Mean scores and standard deviations for the reading measures (letter knowledge, print awareness, and single word reading) (LKG to Grade 2)

		Single Word Reading		Sentence Reading	
	T. S.	10		15	
Grades		Hindi	English	Hindi	English
LKG	Mean	3.60	3.20	-	-
N = 5	SD	1.140	.836		
UKG	Mean	5.80	5.20	-	-
N = 5	SD	.836	.836		
Grade 1	Mean	-	-	9.00	9.80
N = 5	SD		-	1.581	1.164
Grade 2	Mean	-	-	7.80	5.60
N = 5	SD		-	.836	1.140

Note: N=Number of students. T.S. = Total Score.

Table 4.15 shows that the mean scores for the Single Word Reading Test increased from LKG to UKG in both languages, but Grade 1 children scored higher than Grade 2 children on the Sentence Reading test in Hindi and English.

Table 4.15

Mean scores and standard deviations for the Phonological Awareness measures (Rhyme Awareness, Sound Isolation (initial and final sounds), and Sound Deletion) (LKG to Grade 2)

Grades		Sound Isolation (initial sound)		Sound Isolation (final sound)		Sound Deletion		Sound Blending	Sound Substitution
	T. S.	10		10		10		10	10
		Hindi	English	Hindi	English	Hindi	English	English	English
LKG	Mean	4.60	-	4.20	-	4.80	-	-	-
N = 5	SD	.894		1.095		1.304			
UKG	Mean	5.60	5.40	5.40	5.00	5.20	-	4.80	-
N = 5	SD	.548	1.341	1.517	1.224	1.304		.836	
Grade 1	Mean	5.80	-	6.00	-	5.40	5.40	6.60	4.80
N = 5	SD	1.095		.707		.894	1.516	1.140	1.303
Grade 2	Mean	6.00	-	6.20	-	6.00	6.80	-	6.60
N = 5	SD	1.304		.836		1.000	.836		.894

Note: N=Number of students. T.S. = Total Score.

The findings in Table 4.16 indicate that all measures of Hindi phonological awareness showed mean scores increasing from lower grades to higher grades. For the older groups, mean scores for both the Sound Blending and Sound Substitution increased with school grade levels.

Table 4.16

Mean scores and standard deviations for the Language Understanding and Morphological Awareness Measures (Sentence Completion, Base Word, and Word Structure) (LKG to Grade 2)

Grades		Sentence Completion		Base Word		Word Structure	
	T. S.	15		10		10	
		Hindi	English	Hindi	English	Hindi	English
LKG	Mean	-	-	-	-	-	-
N = 5	SD						
UKG	Mean	-	-	-	-	-	-
N = 5	SD						
Grade 1	Mean	7.60	9.60	-	-	4.80	4.20
	SD	1.140	1.816			.836	1.303
N = 5							
Grade 2	Mean	-	-	5.00	4.80	5.40	5.00
	SD			1.581	1.303	1.140	1.000
N = 5							

Note: N=Number of students. T.S. = Total Score.

Table 4.17 shows that for Grades 1 and 2, the Word Structure test mean scores increased with grade levels. The mean score of Grade 2 children on Base Word suggested that this test would be too difficult for LKG and UKG but could be tested at Grade 1 in a further pilot study.

Table 4.17

Mean scores and standard deviations for the Vocabulary Measures (Peabody Picture Vocabulary test and Hindi Vocabulary Test)

		PPVT (English)					Story Retelling (Hindi)
	T. S.	12	12	12	12	12	10
Grades		Set 1	Set 2	Set 3	**Set 4**	**Set 5**	
LKG	Mean	7.40	6.40	5.40	**1.40**	**.20**	6.20
N = 10	SD	.894	1.140	.894	**.894**	**.447**	.837
UKG		Set 2	Set 3	**Set 4**	**Set 5**	Set 6	
N = 10	Mean	7.40	6.00	**5.00**	**2.40**	.40	5.20
	SD	1.341	1.140	**1.581**	**1.140**	1.140	.837
Grade 1		Set 3	**Set 4**	**Set 5**	Set 6	Set 7	
N = 10	Mean	7.40	**6.40**	**5.40**	4.00	.60	6.40
	SD	1.673	**2.701**	**1.673**	2.549	.894	.547
Grade 2		**Set 4**	**Set 5**	Set 6	Set 7	Set 8	
N = 10	Mean	**7.00**	**7.20**	5.80	4.40	1.20	5.80
	SD	**2.549**	**1.303**	1.483	2.302	.836	.837

Note: PPVT=Peabody Picture Vocabulary Test, N=Number of students, T.S. = Total Score.

Table 4.18 presents the results for the PPVT. Sets 4 and 5 highlighted and showed increasing performance from LKG to Grade 2. In contrast, for the Story retelling test (Hindi), the lower grade level achieved higher scores than the higher grade inconsistent with the expected performance on such a task.

4.13.14 Analysis of the Results

The results of the third pilot study showed that the mean scores for most measures increased from LKG to Grade 2. The exceptions were Sentence Reading and Story Retelling (Hindi Vocabulary). These tests were not used in any further pilot studies.

Pilot study 4 was conducted to develop parallel Hindi and English measures based on the 'good' measures from the third pilot study. Parallel measures in both languages for each class level would be useful for comparing the two languages and measuring children's reading ability on the same scale in Hindi and English. In the fourth pilot study, the previous measures that worked well in pilot study 3 replaced the measures that had not worked in previous pilot studies.

4.14 Pilot Study 4

In pilot study 4, 48 children were selected from three schools: 12 in LKG; 13 in UKG; 12 in Grade 1; and 11 in Grade 2. These children had not participated in previous pilot studies. The tests administered at LKG to Grade 2 are presented in Table 4.18 and Table 4.19. Two booklets were developed: one for Hindi and one for English. Each booklet was divided into two sets: Set A and Set B. Set A was for LKG and UKG, and Set B was for Grades 1 and 2. Each set was further divided into four sections, comprising the measures for Word Reading, phonological awareness, morphological awareness, and Vocabulary Knowledge.

Based on the results of the third pilot study, the Single Word Reading Test was administered at all grades (LKG to Grade 2) in L1 and L2. Therefore, in the fourth pilot study, Set A and Set B each had 15 items. Phonological awareness was assessed by five tests, each with 10 items; Sound Isolation (initial sound); Sound Isolation (final sound); Sound Deletion; and Sound

Blending (for LKG and UKG) and Sound Substitution (for Grades 1 and 2). The results of the English Sound Isolation (initial sound and final sound) measures suggested that they could be used with LKG in this pilot study. For Grades 1 and 2, parallel measures could be developed for English Sound Isolation (initial sound and final sound). The mean scores of English Sound Deletion in Grades 1 and 2 in the previous pilot study showed that this measure could be used with LKG and UKG with easier items. In pilot study 3, the results of English Sound Blending showed that it was suitable for LKG and UKG. while Sound Substitution was appropriate for Grades 1 and 2. These two measures were also developed in the Hindi language for the fourth pilot study, to see if they were workable in Hindi.

To assess morphological awareness, Hindi and English Sentence Completion had shown high mean scores. Therefore, these measures were administered to a younger group in pilot study 4. The mean scores of Word Structure in Hindi and English were higher than Base Word, implying that Word Structure could be tried with LKG and UKG. Meanwhile, Base Word would be suitable for Grades 1 and 2 in both languages.

4.14.1 Changes in Pilot Study 4

The English Vocabulary test produced evidence to use in main study. It was showing expected levels of improvements across grade levels and variability in performance in pilot studies 2 and 3 (see Tables 4.12 and 4.17), therefore, this test was not administered in Pilot Study 4 and used in the main study (for details of this measure see sections 4.10.1 and 4.12.2). The Hindi story retelling test was not showing the mean scores in the expected order; higher grades was getting lower scores then lower grades. The test was therefore replaced with a Picture matching test that comprised 12 items for Kindergarten group and 12 items for Grade 1 and 2; further details are presented below. Tables 4.18 and 4.19 show the measures used in Pilot Study 4.

Table 4.18

Tests of English language for pilot 4

	SET A	SET B
Measures	**KG and Grade 1**	**Grade 2 and 3**
Reading test	• Single Word Reading (I=15)	• Single Word Reading (I=15)
Phonological awareness	• Sound Isolation (initial sounds) (I=10)	• Sound Isolation (initial sounds) (I=10)
	• Sound Isolation (final sounds) (I=10)	• Sound Isolation (final sounds) (I=10)
	• Sound Deletion (I=10)	• Sound Deletion (I=10)
	• Sound Blending (I=10)	• Sound Substitution (I=10)
Morphological awareness	• Sentence Completion (I=12)	• Base Word (I=10)
	• Word Structure (I=10)	• Word Structure (I=10)
Vocabulary Knowledge	• PPVT - IV (I=60)	• PPVT - IV (I=60)

Note: I= Number of Items

Table 4.19

Tests of Hindi language for pilot 4

	SET A	SET B
Measures	**KG and Grade 1**	**Grade 2 and 3**
Reading test	• Single Word Reading (I=15)	• Single Word Reading (I=15)
Phonological awareness	• Sound Isolation (initial sounds) (I=10)	• Sound Isolation (initial sounds) (I=10)
	• Sound Isolation (final sounds) (I=10)	• Sound Isolation (final sounds) (I=10)
	• Sound Deletion (I=10)	• Sound Deletion (I=10)
	• Sound Blending (I=10)	• Sound Substitution (I=10)
Morphological awareness	• Sentence Completion (I=12)	• Base Word (I=10)
	• Word Structure (I=10)	• Word Structure (I=10)
Vocabulary Knowledge	• Picture Matching Test – 12	• Picture Matching Test – 12

Note: I= Number of Items

4.15 Improvements in Measures of Hindi and English in Pilot Study 4

4.15.1 Single Word Reading Test

The rationale, procedure, and examples of this measure are available in sections 4.7.3 and 4.13.3. Based on the pilot study 3 results, the Single Word Reading Test could be appropriate for Grades 1 and 2. Grades 1 and 2 were tested again with the Single Word Reading Test to confirm this. This time, however, there were 15 items for each grade level in English and Hindi: Set A items for LKG and UKG; and Set B items for Grades 1 and 2. Five new items were added to the measure for LKG and UKG. These items were selected based on the same criteria used for the other items in both languages. For Grades 1 and 2, new items replaced former items that were too difficult or too easy in pilot studies 1 and 2. Five items that were too easy were deleted, reducing the number of items from 20 to 15. Some words in Hindi and English were chosen from previous pilot tests. Specifically, words that were read correctly or incorrectly by everyone were eliminated, so the remaining words were neither too difficult nor too easy. Words that were chosen for the test in Hindi included 'वातावरण' *('vaataavaran' meaning* 'atmosphere'), and 'पाठशाला' *('paathashaala'* meaning 'school'). In English, examples were 'talk', 'doctor' and 'write'.

4.15.2 Sound Isolation (initial sound) Test

This test was used in previous pilot studies (sections 4.8.2 and 4.13.5). In pilot study 4, this measure tested LKG to Grade 2 through Set A and Set B items in Hindi and English. (Only the Hindi test had been trialed in previous pilot studies.) In English, the mean score at UKG showed that this measure could also be used at LKG. Most items for LKG and UKG came from the test previously used with Grades 1 and 2 in pilot studies 1 and 2. In pilot study 4, new items that

were more difficult were selected for Grades 1 and 2 from their main course book and daily routine words.

An English example for Set A involved the tester saying 'pad', and the child identifying the first letter sound they heard. In this case, the answer would be 'p'. For Set B, the tester would say the word, 'cherry', and the child needed to tell the correct first sound of the word, 'ch'. In Hindi, an example for Set A was 'आम' ('*aam*' meaning 'mango'), and the answer was 'आ' ('*aa/*'). For Set B, an example was the word, 'स्वर्ग' ('*swarg*' meaning 'heaven') and the answer was 'स' *('s').*

4.15.3 Sound Isolation (final sound) Test

The detailed rationale, design, and procedure were explained in sections 4.8.3 and 4.13.6. In pilot study 4, this test was administered at LKG to Grade 2. This test had similar changes to those in Sound Isolation (initial sound). The set of questions used for UKG would be used with LKG in pilot study 4 to see whether it worked for this group. In English, new more difficult items were developed for Grades 1 and 2. Items that were too difficult at Grades 1 and 2 in previous pilot tests were used in pilot study 4 along with the new items selected from the activities given in main course book with the help of English language teachers.

An English example for Set A was: 'dot' ('t') and for Set B: 'watch' ('ch'). A Hindi example for Set A was 'टमाटर' ('*tamatar*' meaning 'tomato'), for which the answer was 'र/' *('r'),* and an example for Set B was 'कूदना' ('*koodna*' meaning 'jump'), for which the answer was 'आ' *('aa').*

4.15.4 Sound Deletion Test

The details of Sound Deletion have been described in sections 4.8.4 and 4.13.7. In pilot study 4, this test was used at LKG to Grade 2 in Set A and Set B in both languages. New items selected for Set A were easier than Set B. The method of selecting items was the same as previously.

In an English example in Set A, the child would be asked to say 'sat' without the 's' ('at'). In Set B, they would be asked to say 'seat' without the 't' ('sea'). In Hindi for Set A, the student would be asked to say 'अमर' ('*amar*' meaning 'immortal') without the letter 'अ' ('*a*'); the answer was 'मर' ('*mar' meaning* 'die'). For Set B: 'शर्त' ('*shart*' meaning 'bet') without '*r*' ('र्'); the answer was 'शत' ('*shat' meaning* 'century').

4.15.5 Sound Blending Test

The details of this measure were explained in section 4.13.8. This measure was for set A (LKG and UKG). The measure for pilot study 4 was developed in Hindi, based on the English measure. Eleven words were selected in each language, but two words were found to be too easy and were removed. These words were in Hindi, 'अब' ('*ab') meaning* 'now'), and in English, 'bat'. The testing method and scoring procedure were identical in Hindi and English. An example in English was, 's-i-t' ('sit'). An example in Hindi was, 'क-ल-श' ('कलश') (*ka-la-sh*) ('*kalash' meaning* 'urn').

4.15.6 Sound Substitution Test

The rationale, procedure, and design were explained in section 4.13.9. Sound Substitution was developed in Hindi for pilot study 4. The selection criteria for the items were the same as for

English items in pilot study 3. The words selected were discussed with the Hindi language teacher and were designed to be neither too difficult or too easy. This measure was tested at Grades 1 and 2. The method of test administration and scoring tests was the same for Hindi and English.

For example, in English the 'f' in 'file' was replaced with 'm' to create 'mile'. In Hindi, the 'ब' ('b') in 'बुद्ध' ('buddh' meaning 'enlightened') was replaced with 'श' ('sh') to create 'शुद्ध' ('shuddh' meaning 'pure').

4.15.7 Base Word Test

Base Word was used in pilot study 3 for measuring morphological awareness (section 4.13.11). In pilot study 3, the Hindi and English Base Word items produced the mean scores reported in Table 4.16. The results suggest that the measure might work at Grades 1 and 2 but it would be too hard for the LKG and UKG. Therefore, in pilot study 4, the Hindi and English Base Word were only administered at Grades 1 and 2.

An English example was 'Dependable' – 'Depend'. A Hindi example was 'असरदार' – 'असर' ('asardaar' – 'asar' meaning 'influential' – 'influence').

4.15.8 Word Structure Test

For the rationale, design, and procedure for the Word Structure measure refer to section 4.13.12. The mean scores for the Hindi and English Word Structure in pilot study 3 (Table 4.16) showed that this measure could be tested at LKG and UKG. Hence, in pilot study 4, Word Structure was tested at LKG to Grade 2, through Set A and Set B in Hindi and English; the Set A items were easier than those in Set B. Words that were too easy in pilot study 3 were used for LKG and UKG and supplemented with some new items. For example, the words 'lunchbox'

and 'goodbye' and in Hindi 'राजकुमार' (*'rajkumaar'* meaning 'prince') or 'बैलगाड़ी' (*'bailgaadi'* meaning 'bullock cart') were too easy at Grade 1 and 2 and were used at LKG and UKG in pilot study 4. New words were developed, such as the Hindi word 'रविवार' (*'ravivaar'* meaning* 'Sunday' was selected from the Hindi course book lesson 'अनिल का हिरन' *('Anil ka hiran'* meaning 'Anil's Deer'. In English, most words were selected from daily routine words, such as 'classroom' and 'homework'. These were discussed with classroom teachers and language teachers in both languages.

Examples from the English Set A were, 'password' – 'pass' and 'word', and from Set B, 'dependable' – 'depend' and 'able'. Hindi examples from Set A were 'रजकुमार' (*'Rajkumar'* meaning 'prince') – 'राज' (*'raj'* meaning 'rule'), 'कुमार' (*'kumar'* meaning 'boy'); and from Set B: 'प्रतिदिन' (*'pratidin'* meaning 'everyday') – 'प्रति' (*'prati'* meaning 'every'), 'दिन' (*'din'* meaning 'day').

4.15.9 Picture Matching Test (Hindi Vocabulary)

Rationale

In India, picture-matching tasks are a common way to assess Hindi vocabulary knowledge, with children selecting pictures to identify the meaning of words. This test is based on the activities given in Hindi course books at the end of each lesson. Children match pictures with correct words by pointing a pencil or finger. This form of test is also found in the Learn Hindi Vocabulary Activity Book (Bhatt, 2012).

Design

For pilot study 4, the Hindi Picture matching test were designed based on the activities need to be done by children after ending each lesson in Hindi main course books. For example, the activity was *'listen to the words and identify the correct matching picture'*. Initially, 18 items were selected for Set A and 20 items selected for Set B. These items further discussed with class teachers of selected schools and Hindi language teacher. After a discussion, six items were removed from Set A and eight items were removed from Set B, because children might not be experienced with these words and pictures, for example in Set A तेंदुआ (panther), and in Set B उपग्रह (satellite). Finally, 12 items have been used in Set A and Set B. Examples are given below.

Procedure

The test had 12 items in set A and 12 items in set B. A picture presented next to every word and the examiner asked the student to match the right picture with the word that the examiner pronounced; the picture next to the word did not necessarily correspond to the word. Students had to put the finger on the right picture of word read to them by examiner. Examples given below. Example of Hindi Picture Vocabulary Test

Figure 4.2

Example of Hindi Picture Matching Vocabulary Test

Examples:

1. ---------- पंखा (Fan)
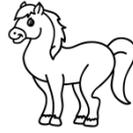
2. ---------- मंदिर (Temple)
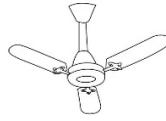
3. ---------- घोड़ा (Horse)

4.15.10 Descriptive Statistics across the different grades

In tables 4.20 to 4.23, the mean scores and standard deviations presented of pilot study 4, followed by a discussion of the results.

Table 4.20

Mean scores and standard deviations for the Single Word Reading Test

Grades	T. S.	Single Word Reading	
		SET A	
		15	
		Hindi	English
LKG	Mean	4.00	4.15
N = 12	SD	1.41	1.40
UKG	Mean	5.15	4.84
N = 13	SD	1.40	1.21
		SET B	
Grade 1	Mean	8.46	8.69
N = 12	SD	1.80	1.70
Grade 2	Mean	9.53	9.23
N = 11	SD	1.56	2.08

Note: N=Number of students. T.S. = Total Score.

Table 4.21

Mean scores and standard deviations for the Phonological Awareness Measure, Sound Isolation (initial and final sounds), Deletion, Blending, and Substitution (LKG to Grade 2)

		Sound Isolation (initial sound)		Sound Isolation (final sound)		Sound Deletion		Sound Blending		Sound Substitution	
	T. S.	**10**		**10**		**10**		**10**		**10**	
Grades		Hindi	English	Hindi	English	Hindi	English	Hindi	English	Hindi	English
SET A											
LKG	Mean	4.08	3.83	3.67	3.75	3.92	3.42	4.00	4.17	-	-
N = 12	SD	1.37	1.19	1.07	1.13	.99	.900	.95	.93		
UKG	Mean	4.53	4.46	4.31	4.62	4.30	4.31	4.69	4.54	-	-
N = 13	SD	1.12	1.45	1.38	1.34	1.54	1.10	1.60	1.66		
SET B											
Grade 1	Mean	5.75	5.83	5.08	5.72	5.00	4.91	-	-	5.00	5.17
N = 12	SD	.96	.83	.99	1.10	.953	1.08			1.12	.93
Grade 2	Mean	6.36	6.09	6.18	5.73	5.36	5.72	-	-	6.36	6.36
N = 11	SD	1.02	1.51	1.07	1.10	1.20	1.10			.92	1.20

Note: N=Number of students. T.S. = Total Score.

Table 4.22

Mean scores and standard deviations for the Morphological Awareness measures (Sentence Completion, Base Word and Word Structure, LKG to Grade 2)

		SET A					
		Sentence Completion		**Base Word**		**Word Structure**	
	T. S.	**12**		**10**		**10**	
Grades		Hindi	English	Hindi	English	Hindi	English
LKG	Mean	2.58	2.83	-	-	3.41	3.58
N = 12	SD	.90	.93			1.24	1.16
UKG	Mean	3.92	3.69	-	-	4.23	4.38
N = 13	SD	1.03	.94			1.09	1.75
		SET B					
Grade 1	Mean	-	-	5.00	5.67	4.80	4.20
N = 12	SD			.95	1.07	.90	1.05
Grade 2	Mean	-	-	6.91	6.64	5.72	6.27
N = 11	SD			1.64	.92	.90	1.48

Note: N=Number of students. T.S. = Total Score.

Table 4.23

Mean scores and standard deviations for the Vocabulary Measures (Picture Matching Test)

		Picture Matching Test
		SET A
	T. S.	12
Grades		Hindi
LKG	Mean	5.50
N = 12	SD	1.00
UKG	Mean	4.46
N = 13	SD	1.40
		SET B
Grade 1	Mean	6.83
N = 12	SD	1.19
Grade 2	Mean	6.83
N = 11	SD	1.25

Note: N=Number of students. T.S. = Total Score.

4.15.11 Analysis of the Results

For most of the measures the mean scores improved from lower to higher grades and were now satisfactory for the main study (see Tables 4.20 to 4.23). However, this was not the case for Hindi Vocabulary (picture matching), where Grade 1 scored higher than Grade 2 (see Table 4.23). Therefore, this measure needed to be amended and re-trialled.

4.16 Change in the KG School system

In April and May 2017, before the start of the fifth pilot study, the participated schools' management committee changed the kindergarten system. LKG and UKG were replaced with a single kindergarten grade (KG). Therefore, the current study was modified to investigate the new KG, and Grades 1, 2, and 3, as these would be equivalent to the former LKG to Grade 2. The age groups were unchanged, and ranged from four to eight years of age. There was also a slight change to the curriculum for the school years, but that would not affect the language skills of the selected grades, as participants for the main study were selected on their language use in L1 Hindi and L2 English). As a result, Set A measures were used for KG and Grade 1, and Set B measures were used for Grades 2 and 3.

4.17 Pilot Study 5

Pilot Study 5 conducted to improve the Hindi Vocabulary measure because this measure did not show expected improvements in scores with school year level in Pilot Study 4.

4.17.1 Participants of Pilot Study 5

There were the 48 participants in this pilot testing. The participants were 12 children from KG, 13 children from Grade 1, 11 children from Grade 2, and 12 children from Grade 3. These were the same children from Pilot Study 4, however practice effects were minimised due to the introduction of new vocabulary measure.

4.17.2 Hindi Vocabulary Test

Rationale

For pilot study 4, the Hindi vocabulary measure was based on the vocabulary measure used by Nakamura and De Hoop (2014) and the Picture Identification Task which has been developed to assess Hindi-English children's reading ability by (Vagh, 2012).

Design

The items for vocabulary measure selected from the Hindi main course books. In the textbooks, each reading lesson entails a list of words, which were targets for improving vocabulary. Initially, 30 items selected for this test; with care taken that, these items were neither too easy nor too difficult for children. Each item was subsequently discussed with Hindi language teachers. Following these discussions, four questions were replaced with more difficult ones because might be too easy for children. For example, because most children could read the word 'potato, the question 'Can you show me a "potato"? Changed to 'Can you show me a "capsicum"?' Despite these changes, however, the number of items per test were kept at 30. There was only one set of this measure for children of all grades, unlike to other measures.

Procedure

Thirty cards with 120 black-and-white pictures used; in some cases, the same order of pictures printed on 30 A4 pages. Four pictures presented on each card or page, of which one example given below: a potato, a cauliflower, a brinjal (eggplant), and a capsicum. The examiner showed each card to the student and verbally presented a word that represented one of the pictures on the card: 'could you please show me a "capsicum" on this page?' Children instructed to match the word with the right picture.

Figure 4.3

Example for Hindi Vocabulary Test
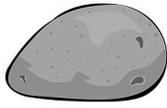
(1)

(2)

(3)

(4)

4.17.3 Results of Hindi Vocabulary Measure Pilot Study 5

The mean scores on Hindi Vocabulary increased with grade levels consistent with age and education. Reasonable levels of variability were also achieved (Table 4.24).

Table 4.24

Mean scores and standard deviations for the Hindi Vocabulary measures

	Hindi Vocabulary Test	
Total Scores	**30**	
KG	Mean	15.08
N=12	SD	1.56
Grade 1	Mean	16.92
N=13	SD	1.70
Grade 2	Mean	18.09
N=11	SD	2.66
Grade 3	Mean	20.08
N=12	SD	2.67

Note: N=Number of students.

4.17.4 Analysis of the Results

The results of the fourth and fifth pilot studies produced means and standard deviations of phonological awareness, morphological awareness, reading ability and vocabulary knowledge for UKG/KG to Grade 2/3 in L1 Hindi and L2 English (see Tables 4.20 to 4.24). The mean scores increased consistently with grade, age, and level of education, and the standard deviations revealed variability in performance. Overall, pilot studies 4 and 5 provided such detailed, accurate information that the measures reported in the two pilot studies were used for the main study.

4.18 Summary

Table 4.25 provides an overview of the five pilot studies carried out to develop the measures used in the main study.

Table 4.25

Overview of the results from the pilot studies

Pilot study	Number of Children	Results
1	12	A ceiling effect on measures and results yielded unacceptable scores with poor variability.
2	40	Ceiling effects on some measures. The PPVT-IV was appropriate.
3	20	Some measures showed good variability in the results. Inappropriate measures were removed.
4	48	All measures except the Hindi Vocabulary test had appropriate mean scores and variability and could be used for the main study.
5	48	The revised Hindi Vocabulary measure was appropriate and could be used in the main study.

The general procedures, participants, research assistants, ethical approval, and implementation of the five pilot studies were discussed in this chapter. Among Hindi-English bilingual children, these pilot studies were carried out in Delhi, India. This chapter has detailed the development of Hindi and English measures based on previous research, relevant literature, and the schools' curriculum and text books. Experienced specialist teachers and teachers in Hindi and English

reviewed the measures and provided feedback, which was used along with the results of the five pilot studies to develop a series of measures suitable for the target population: young, bilingual Hindi-English learners in India. The pilot testing offered a better understanding of how the Hindi and English measures should be administered before being used in the main study. Informed by the pilot studies, adjustments were made to the measures in terms of timing, instructions, increasing difficulty levels of items, reducing the number of items, and eliminating an entire measure. The measures that were satisfactory in terms of variability and mean scores were included in the main study. Appendix A (English) and Appendix B (Hindi) contain a full description of the 16 measures.

Chapter 5 Main Study Data and Results

5.1 Introduction

This chapter presents the procedures and results of main data collection in Hindi and English, which was conducted among young Hindi bilingual children who learn English as a second language in the Delhi region of India. The Hindi and English measures were developed to address the following research questions:

(1) Whether there was a relationship between phonological and morphological awareness with the Hindi L1 and English L2 word reading.

(2) To examine the morphological and phonological awareness as potential predictors of Hindi L1 and English L2 word reading.

(3) To find out if L1 Hindi morphological and phonological awareness predicts the variability in English L2 word reading.

The chapter provides details on the participants took part in this study and provides a description of the measuring materials and the administration of the tests. The descriptive statistics and reliability of the test items used in the research using Cronbach's alpha are first discussed in this chapter, followed by data collection of 213 Hindi-English bilingual children those participated in the main data collection. The findings of the analysis are stated on the basis of a correlation between measurements, followed by the results of partial correlations between dependent and independent variables. Having followed this, Hierarchical Multiple Regression calculations were conducted to examine the importance of phonology, morphology and vocabulary in describing the word reading of L1 (Hindi) and L2 (English). Single word reading was the dependent variable in these studies, and phonological awareness and

morphological awareness in both Hindi and English were the independent variables. The Gender as a control variable was also used in this study. Number of studies have used these statistical analyses methods for calculation and comparison of average scores across selected grades, variability of the measures, predicted variables among cognitive linguistic skills in different languages and influence of one language to another (Apel et al., 2012; Carlisle, 2000; Ku & Anderson, 2003; Saiegh-Haddad & Geva, 2008; Smythe et al., 2008; Wang et al., 2009). The final list of measures that used in the study can be found in Tables 5.1 and 5.2. The measures presented to the children in same order shown in these lists.

Table 5.1

Tests for Hindi language

Measures	SET A KG and Grade 1	SET B Grade 2 and 3
Reading test	• Single Word Reading (I=15)	• Single Word Reading (I=15)
Phonological awareness	• Sound Isolation (initial sounds) (I=10)	• Sound Isolation (initial sounds) (I=10)
	• Sound Isolation (final sounds) (I=10)	• Sound Isolation (final sounds) (I=10)
	• Sound Deletion (I=10)	• Sound Deletion (I=10)
	• Sound Blending (I=10)	• Sound Substitution (I=10)
Morphological awareness	• Sentence Completion (I=12)	• Base Word (I=10)
	• Word Structure (I=10)	• Word Structure (I=10)
Vocabulary Knowledge	• Hindi Vocabulary Test (I=30)	• Hindi Vocabulary Test (I=30)

Note: I = Number of Items

Table 5.2

Tests for English language

Measures	SET A KG and Grade 1	SET B Grade 2 and 3
Reading test	• Single Word Reading (I=15)	• Single Word Reading (I=15)
Phonological awareness	• Sound Isolation (initial sounds) (I=10)	• Sound Isolation (initial sounds) (I=10)
	• Sound Isolation (final sounds) (I=10)	• Sound Isolation (final sounds) (I=10)
	• Sound Deletion (I=10)	• Sound Deletion (I=10)
	• Sound Blending (I=10)	• Sound Substitution (I=10)
Morphological awareness	• Sentence Completion (I=12)	• Base Word (I=10)
	• Word Structure (I=10)	• Word Structure (I=10)
Vocabulary Knowledge	• PPVT - IV (I=60)	• PPVT - IV (I=60)

Note: I = Number of Items

The previous chapter reported on the pilot studies undertaken to develop the reading and language tests used for the main study. This chapter reports the results of the main study. First, the participants' reading and language scores are presented using descriptive statistics. Second, the relationship between the dependent and independent variables were measured using correlation and partial correlation analyses in each language. Then, the best predictors of Hindi and English reading levels were explored by using regression analysis. Finally, the differential influence of individual variables on reading ability were investigated through multiple regression analyses.

5.2 Hindi and English measures used in main study

This section outlines the measures used to test reading, phonological awareness, morphological awareness and vocabulary knowledge in Hindi and English. For each measure, reference is made to the developmental pilot studies in Chapter 4. Where it is appropriate, specific sections and tables are referred.

Reading – In order to measure the children's reading ability in the main study, the Single Word Reading Test was developed.

Single Word Reading Test: The background to, and development of, this measure can be found in section 4.7.3. As discussed this measure was revised during the pilot studies due to low levels of variability and poor performance by some students on alternative versions of this measure, and some lack of expected improvements in mean scores from lower to higher grade levels. Therefore, the specific measure used in the main study was based on measure used across several different pilot studies (with revisions explained in pilot study 1, 3 and 4). The materials and procedures used in the main study were those used in pilot study 4; for the younger children (KG and Grade 1) see section 4.13.3; for the older students (Grade 2 and 3) see section 4.15.1). These versions of the measures showed good variability in performance and appropriate development of scores across the grades tested; see Table 4.14 (for lower grades) and Table 4.20 (for lower and higher grades).

Phonological awareness – Phonological awareness was used to understand the sound knowledge of letters. The following five tests were selected to use in the main study because they showed good variance and ascending mean scores from lower grades to higher grade levels.

Sound Isolation (initial sound): The rationale for this measure can be found in section 4.8.2. Results from the first two pilot studies testing this measure indicated lower grade children performing better than higher grade children, and some ceiling effects (Tables 4.4 and 4.10), and led to the need to revise and re-pilot the measure. In pilot study 3, the Hindi language measure produced more acceptable scores (Table 4.15), and the results of pilot study 4 showed better scores for the English version (Table 4.21). Therefore, the materials and procedures used in pilot study 3 for Hindi (section 4.13.5) and in pilot study 4 for English (section 4.15.2) were used in the main study.

Sound Isolation (final sound): For the rationale of this measure, refer to section 4.8.3. As described, due to low levels of variability and poor performance by some students in alternative versions of this measure, some of which did not exhibit expected improvements in mean scores from lower to higher grade levels, this measure was revised across the pilot studies. As a result, the main study's specific measure was based on the performance in numerous distinct pilot studies (with revisions explained in pilot studies 1, 3 and 4). In pilot study 4, the mean scores were in ascending order from lower to higher year levels with good variability in performance (Table 4.21). In the main study, the materials and procedures with examples used those in the pilot study 3 (for Hindi) and pilot study 4 (for English) (sections 4.13.6 and 4.15.3).

Sound Deletion: The background and development of the Sound Deletion test has been described under section 4.8.4. In the first two pilot studies, this measure showed that lower grade children performed better than higher grade children, and that there were some ceiling effects. This indicated the need to amend and re-pilot the measure (Tables 4.4 and 4.10). Pilot study 3 obtained better scores in all grade levels for the Hindi language measure (Table 4.15), while pilot study 4 yielded acceptable scores with good variability in higher grades for the English version (Table 4.21). For the fourth pilot testing, this test was developed in two sets

(Set A for lower grades, Set B for higher grades) and was reported in section 4.15.4. In the main study, the materials and procedures used in pilot study 3 (for all grades in Hindi) and pilot study 4 (for all grades in English) were used; see sections 4.13.7 and 4.15.4.

Sound Blending: This test was introduced in pilot study 3 for English language. For the rationale of this test, refer to section 4.13.8. For pilot study 4, this test was developed in Hindi and re-piloted (see section 4.15.5), and used for children in the lower grades in Hindi and English. The results showed acceptable scores with good variability in both languages (see Table 4.21) and was used for the main study in KG and Grade 1.

Sound Substitution: This test was first used in pilot study 3 for the English language. Section 4.13.9 sets out the rationale for this test. For pilot study 4, this test was developed in Hindi and was re-piloted (see section 4.15.6) with children in higher grades in both languages. The results showed satisfactory scores in both languages with good variability (Table 4.21) and were used for the main study in Grades 2 and 3.

Morphological Awareness – In the main study, morphological awareness was measured by the three following tests, which predicting variance and mean scores were in ascending order from lower to higher grades.

Sentence Completion: The background and development of this measure was described in section 4.9.1. Results from the first two pilot studies of this measure indicated some ceiling effects, and lower grade children performing better than higher grade children (see Table 4.5 and Table 4.11), and led to the need to revise and re-pilot the measure. In pilot study 3, the English language measure again showed ceiling effects (Table 4.16). Therefore, in pilot study 4, to avoid the ceiling effect, the test was used for lower grade levels, which produced adequate results (Table 4.22). Therefore, in the main study this measure was used for lower grade levels (KG and Grade 1).

Base Word: This test was introduced in pilot study 3 in both Hindi and English. Section 4.13.11 explains the rationale, design, approach, scoring method, and examples. In pilot study 4, the same test was used for higher grade levels, and the results revealed scores in appropriate order and good variability in performance (Table 4.22), therefore this test was used in the main study for Grades 2 and 3.

Word Structure: Background information and examples for this test are available in section 4.13.12 for higher grades in Hindi and English languages. Based on the good performance of children in the higher grades, the test was then developed for lower grades as well, and re-piloted in pilot study 4 (section 4.15.9). The results indicated satisfactory performance in terms of scores and variance (Table 4.22). As a result, this test was used in the main study for all grade levels.

Vocabulary Knowledge – In the main study, Hindi and English vocabulary knowledge was measured by the two tests described below.

Hindi Vocabulary Test: For details of this test and examples, refer to section 4.17. This test was finalised after five pilot studies because the other measures (adopted Hindi vocabulary, story re-telling, and picture matching) tested in previous pilot studies, did not work (Tables 4.6, 4.12, 4.17 and 4.23). These tests showed poor performance of children with less or no variability in scores. However, the Hindi Vocabulary Test used in the fifth pilot study produced ascending mean scores and good variability in children's performance (Table 4.24). Therefore, this test was used in the main study for all grade levels.

Peabody Picture Vocabulary Test – IV (PPVT – IV): For detailed information of the PPVT, see section 4.10.1 (only one test was used). In pilot study 2, five sets of tests were used for all grades (section 4.12.1). This is a standardised test of English vocabulary. This test

showed the ascending scores from lower to higher grade levels and variance in pilot study 2 and 3 (Tables 4.12 and 4.17). Therefore, the test used for all grade levels in the main study.

5.2.1 Scoring method for each measure used in main study

Children's responses to each question were recorded on an excel spreadsheet and were used to score selected measures in the main study. Each response was scored a mark of one for a correct answer, and a mark of zero for an incorrect answer or no answer. The score on the measure was the total of the marks (raw scores). These were used in the statistical analyses.

5.3 Selection of participants for the main study

The main study data were collected from a cohort of 213 children who were speakers of Hindi L1 and learners of English L2. There were almost equal numbers of males and females in the sample. Participants were selected from three private schools in Delhi, India. The researcher approached eight schools in Delhi, India where Hindi was used as the first language and English as the second language, and where the chances of any influence of any third language were smaller, and where a researcher knew someone at each school to contact. Three schools agreed to participate in the study. Permission for conducting the research in these schools was granted by the Principal and the management committee.

The researcher asked class teachers to provide the names of students who were willing to participate in the study voluntarily. The teachers of potential classes gave the lists of 279 students who had expressed their willingness to participate in this study. Subsequently, the researcher met with class teachers in the selected schools to discuss the two eligibility criteria for children to participate: only Hindi/English bilingual students; and students who began the school session at the beginning of the academic year. Class teachers provided a second list of 220 children based on these criteria. Out of 279 children, 50 were excluded due to using a third

language or dialect, and nine children were excluded because they did not start school at the beginning of the academic year. The class teachers who had access to students' records were able to provide information regarding the language spoken by the students and their admission time. To address the overall development of children—personal, societal, and academic development—parents/guardians were required to attend Parent Teacher Meetings (PTMs) once a month. During these meetings, class teachers gather information including the languages used by each child. Seven children dropped out of the study, leaving a cohort of 213 for the main study. Although these seven children participated in one session, they could not participate in the English session due to illness and their parents' concern for upcoming monthly examinations (the class teachers informed the researcher of the reason for their absences), and consequently were eliminated from the cohort. All the participants were in the middle of their academic year. In addition, no participants in the pilot studies were included in the main study, in order to avoid possible practice effects.

The selection of appropriate ages was ensured because there is an average specific age for admission into each grade level (i.e., four- to five-years-old in Kindergarten, five- to six-years-old in Grade 1, six- to seven-years-old in Grade 2, and seven- to eight-years-old in Grade 3). In schools, children's admission is open for a certain number of months at the start of every academic year (in the months of February, March, April, and May). If the child not admitted in these months then they have to wait until the next admission session because the schools filled their vacancies in these selected months and admission is then closed. However, there were some exceptional cases for admitting children during the academic year (for example, job transfer of parents, army candidates or VIP seats available for politicians' children throughout the year but these are very rare cases exempted from this study. On an average four children were in this situation in Grade 2 and 3, who were not eligible to take part in this study for maintaining the age group selection criteria. Table 5.3 presents the participants demographics.

Table 5.3

Demographic Information (n = 213)

Characteristic	*Total Students agreed to take part in main study*	*Students excluded due to using a third language or dialect*	*Students excluded for maintaining age group criteria*	*Number of participants selected from each grade level*	*Participants who drop out from the testing session*	*Participants left for final data collection*
Age (years)						
4–5 years **(Kindergarten)**	64	11	0	53	3	50
5–6 years **(Grade 1)**	70	15	0	55	1	54
6–7 years **(Grade 2)**	68	9	5	54	2	52
7–8 years **(Grade 3)**	77	15	4	58	1	57

Investigation and testing took place in the children's school and within school hours. Participation based on consent from the school principals, parents or guardians, and the children themselves prior to testing. An information sheet explained the objectives of the study and assured the anonymity and confidentiality of participants. The participants informed that their involvement was purely voluntary and would not affect their academic grades at any point in time. Once the children, their parents or guardian and the principals had a clear acknowledgement of information, they signed consent forms.

The researcher formulated a schedule to conduct the main study, with details of times, tests, and sessions. One hour was the average estimated time for one session with a 15-minute break (see Table 5.4). The average time of an English session was more than a Hindi session.

Table 5.4

Estimated time for individual sessions

Language	Measures	Measures	Number of items	Approximate time allocation
Session 1	Reading	(1) Single Word Reading	15	3–5 minutes
(Hindi)	Phonological Awareness	(1) Sound Isolation (initial sound)	10	2–4 minutes
		(2) Sound Isolation (final sound)	10	2–4 minutes
		(3) Sound Deletion	10	2–4 minutes
		(4) Sound Blending/Substitution	10	2–4 minutes
	Break			10 minutes
	Morphological Awareness	(1) Sentence Completion	12	3–4 minutes
		(2) Base Word	10	2–4 minutes
		(3) Word Structure	10	2–4 minutes
	Break			5 minutes
	Vocabulary Knowledge	(1) Hindi Vocabulary Test	30	8–10 minutes
Session 2	Reading	(1) Single Word Reading	15	3–6 minutes
(English)	Phonological Awareness	(1) Sound Isolation (initial sound)	10	3–5 minutes
		(2) Sound Isolation (final sound)	10	3–5 minutes
		(3) Sound Deletion	10	3–5 minutes
		(4) Sound Blending/Substitution	10	3–5 minutes
	Break			10 minutes
	Morphological Awareness	(1) Sentence Completion	12	3–5 minutes
		(2) Base Word	10	2–4 minutes
		(3) Word Structure	10	2–4 minutes
	Break			5 minutes
	Vocabulary Knowledge	(1) Peabody Picture Vocabulary Test (PPVT)	60	12–15 minutes

To ensure that they knew how to execute each task, the participants presented with several basic instructions with examples. Participants not penalized for any incorrect attempt, even though all participants had some incentives. For instance, after finishing one session, each child will get one pencil/pen. One session was done in one day for each individual child (for example, one Hindi day, and another day was for English) so that they would not be tired.

5.4 Research Assistants for main study

For the main study, the researcher recruited the volunteers and relievers, who had helped in the pilot studies, as research assistants. In the main study, they were required to attend and observe each test administration session over the first three days. During these sessions, the tests were administered by the researcher (see detailed information under Chapter 4, section 4.3). The research assistants were provided with written instructions in both Hindi and English for administering the tests in the main study. They were instructed to make these tests as objective as possible by ensuring that the tests were administered in a consistent and standardised way and that the instructions were clear. For each test, there were comprehensive instructions with clear examples. See Appendix I for English instructions and Appendix J for Hindi instructions. The research assistants tested 130 children on all measures in the main study data. The scores from each test were transferred to the Social Sciences Statistical Software (SPSS) package for data processing.

5.5 Data Collection Procedure

The main data collection procedure took place on the school premises. The administration procedure for the main study was similar to that used for the pilot studies. The assessment tests were the same for each participant in every grade level. All the tests and procedures clearly explained with examples. The schedule for the data collection based on the information given

by the school principals and class teachers and the availability of participants. The entire data collection procedure took approximately 19 weeks to complete. In every grade level, all the participants first tested with the Hindi language measures followed by the English language measures. Administration of the tests carried out in a suitable, quiet room inside the school. At the end of each session, scores were marked and recorded in an Excel spreadsheet. The scores were marked in a dichotomous manner (i.e., 1 = correct; 0 = incorrect).

Initially, the results of the data analyses presented using descriptive statistics and measures of reliability.

5.5.1 Descriptive Statistics and Reliability

Mean scores and standard deviations of the main data were calculated to provide the information about the measures for further interpretations. The descriptive statistics presented in Tables 5.5 and 5.6 show descriptive statistics with means and standard deviations of phonological awareness, morphological awareness, and reading ability with vocabulary tests for each grade level. Overall, the mean values and standard deviations improve from lower grade levels to higher grade levels in Set A and Set B as the grade level progresses, consistent with grade, age, and level of education. All measures showed a reasonable scores indicating expected variability for the measures. Furthermore, the average scores were not near the minimum and maximum score for any measure. Therefore, there was no evidence of ceiling and floor effects that could affect the variability of measures. The results also showed that the scores for each variable were ideal for carrying out correlational calculations intended answering the research questions.

These descriptive statistics were accompanied by calculations of item reliability to ensure the internal consistency of the measures. In this study, tests were developed to measure the abilities of the children as part of answering the research questions. However, such tests need to show

that they are measuring what they are supposed to be measuring reliably. Taber (2018) cites Cronbach's alpha as a way to measure an instrument's reliability. Cronbach's alpha has been described as "one of the most important and pervasive statistics in research involving test construction and use" (Cortina, 1993, p. 98), to the extent that its use in research with multiple-item measurements is considered routine" (Neal Schmitt, 1996, p. 350). Cronbach's alpha estimates how consistently participants respond to the items within a measure, providing a means to calculate internal consistency. Cronbach's alpha was calculated using SPSS version 25.

For the Hindi measures, coefficient alpha varied from .536 to .841, and for the English measures, the values varied from .492 to .769 (see Tables 5.5 and 5.6). Cronbach (1951) suggested that a high value of alpha was 'desirable' when an instrument was used to assign a score to an individual. However, Cronbach has also argued that the key point should be that scores obtained when using an instrument had to be interpretable – and this was often possible without needing high values of alpha. Neal Schmitt (1996) has suggested that there is no general level (such as 0.70) where alpha becomes acceptable. Instead, instruments with low alpha values can still prove useful in some circumstances.

Furthermore, correlations between the measures of phonological awareness within language and the same for the measures of morphological awareness within language measuring a similar skill, then they should be correlated. Showing such correlations may also help with usefulness of measures with lower alpha values. Therefore, although some of the alpha values were lower than preferred, the measures may still provide useful information, particularly given that multiple measures of the two main constructs in the study (phonological and morphological awareness) were used and interpreted.

The descriptive statistics and Cronbach's alpha values are presented in Tables 5.5. and 5.6.

Table 5.5

Descriptive Statistics and Cronbach's Alpha for the Hindi Study Data

	SET A						SET B					
	KG (N=50)			Grade 1 (N=54)			Grade 2 (N=52)			Grade 3 (N=57)		
Measures	Mean	SD	CA	Mean	SD	CA	Mean	SD	CA	Mean	SD	CA
H_SWR (I = 15)	5.96	2.97	.657	6.25	3.51	.801	7.21	3.59	.812	7.45	3.49	.774
H_SI (IS) (I= 10)	3.80	2.17	.582	4.24	2.50	.708	5.15	2.63	.725	6.05	2.56	.724
H_SI (FS) (I=10)	3.46	2.34	.659	4.70	2.77	.761	5.36	2.52	.692	5.40	2.29	.597
H_SD (I = 10)	3.90	2.24	.589	5.00	2.74	.747	4.07	2.83	.785	4.07	2.85	.796
H_SB/ SS (I=10)	2.30	1.95	.621	2.37	2.38	.758	3.63	3.01	.841	4.19	3.10	.838
H_SC/BW (I=12/10)	3.22	2.47	.684	4.05	2.85	.756	3.94	2.38	.710	4.07	2.32	.714
H_WS (I= 10)	3.36	2.06	.536	3.74	2.63	.766	3.42	2.52	.739	4.15	2.69	.768
H_VT (I=30)	13.08	4.88	.732	14.59	5.65	.817	16.03	5.25	.775	16.28	4.49	.698

Note. H_SWR=Hindi Single Word Reading, H_SI (IS)=Hindi Sound Isolation (initial sound), H_SI (FS)=Hindi Sound Isolation (final sound), H_PD=Hindi Sound Deletion, H_SB/SS=Hindi Sound Blending/Substitution, H_SC=Hindi Sentence Completion (for KG and Grade 1), H_BW=Hindi Base Word (for Grade 2 and 3), H_WS= Hindi Word Structure, H_VT=Hindi vocabulary test, MPS=Maximum Possible Score, SD=Standard Deviation, CA=Cronbach's Alpha, N=Number of Participants, I=Number of Items.

Table 5.6

Descriptive statistics and Cronbach's Alpha for the data English Study

Measures	SET A									SET B		
	KG (N=50)			Grade 1 (N=52)			Grade 2 (N=54)			Grade 3 (N=57)		
	Mean	SD	CA	Mean	SD	CA	Mean	SD	CA	Mean	SD	CA
E_SWR (I = 15)	4.98	2.72	.613	5.75	3.19	.724	5.03	2.93	.661	6.21	3.42	.753
E_SI (IS) (I= 10)	3.18	2.33	.674	3.22	2.29	.657	4.03	2.41	.654	4.05	2.46	.672
E_SI (FS) (I=10)	2.88	1.96	.567	3.57	2.09	.563	3.51	2.42	.705	3.70	2.49	.724
E_SD (I = 10)	2.82	1.95	.562	2.83	1.89	.492	2.80	2.13	.621	3.61	2.41	.676
E_SB/ SS (I=10)	1.52	1.61	.608	1.61	1.70	.609	3.51	2.63	.746	3.64	1.10	.625
E_SC/BW (I=12/10)	2.98	2.20	.626	3.27	2.05	.517	3.90	2.40	.655	4.03	2.23	.589
E_WS (I= 10)	2.60	2.14	.658	2.70	2.07	.610	3.28	2.42	.702	4.08	2.72	.769
PPVT, 5 Sets (60 items)	17.42	6.06	.692	18.51	5.99	.673	25.65	5.33	.518	28.82	6.00	.619

Note. SWRT = Single Word Reading, SI (IS) = Sound Isolation (initial sound), SI (FS) = Sound Isolation (final sound), PD = Sound Deletion, SB/SS = Sound Blending/Substitution, sSC = Sentence Completion (for KG and Grade 1), BW = Base Word (for Grade 2 and 3), WS = Word Structure, PPVT = Peabody Picture Vocabulary Test, MPS = Maximum Possible Score, SD = Standard Deviation, CA = Cronbach's Alpha, N = Number of Participants, I = Number of Items.

5.5.2 Correlational Analyses

Pearson correlation coefficients were calculated between the measures of word reading, and phonological and morphological awareness to answer the research questions about whether there is a relationship between word reading and phonological and morphological awareness. Correlational analyses do not imply the causality of observed effects, which was not a focus of the current research study. However, the strength and direction of observed relationships could

suggest future research via an intervention or/and a longitudinal study (for more details see Chapter 6, section 6.4: Implications for teaching reading). The interpretation of the correlational analyses was based on Cohen (1988, pp. 79-81). Cohen recommended that an R-value between .10 and .29 indicates a "small effect size", between .30 and .49 suggests a "medium effect size", and between .50 and 1.0 is a "large effect size".

In this study the primary relationships of interest were those between phonological awareness, morphological awareness and Hindi and English word reading among Hindi–English bilingual children. Measures of vocabulary were also included in the study since researchers such as Nichols and Rupley (2004) argue that knowledge of vocabulary is a crucial aspect of literacy ability. Therefore, to examine the specific effects of phonological and morphological skills in reading, vocabulary was controlled.

5.5.2.1 Correlation and partial correlation analyses for Kindergarten (KG) Hindi

Table 5.7 presents the correlations between the Hindi Single Word Reading scores of KG with the other Hindi measures used in this study. Note that all measures are significantly related to the Word Reading measure, and most are large correlations, except for the medium correlations found with the Hindi Sound Isolation (initial sound) and the Hindi Sound Blending measures. Partial correlations between the Hindi Single Word Reading scores of KG with the other Hindi measures after controlling Hindi vocabulary were also calculated. Once vocabulary was controlled, the result still indicated significant correlation between Hindi word reading and Sound Isolation (final sound), Sound Deletion, Sentence Completion and Word Structure.

Table 5.7

Correlations and Partial Correlations between Kindergarten (KG) Hindi word reading (total score) and all the Hindi measures used in KG study controlling for Hindi Vocabulary Test.

Measures	Correlation	Partial Correlation
Hindi Sound Isolation (initial sound)	.339*	.045
Hindi Sound Isolation (final sound)	.770**	.489**
Hindi Sound Deletion	.648**	.310*
Hindi Sound Blending	.308*	−.067
Hindi Sentence Completion	.871**	.716**
Hindi Word Structure	.778**	.603**
Hindi Vocabulary Test	.724**	

Note. * *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)*

5.5.2.2 Correlation and partial correlation analyses for Kindergarten (KG) English

Table 5.8 presents all the correlations with English Word Reading and the other English measures in the study. The measures of Sound Deletion, Sound Blending and Word Structure were not significantly correlated with English reading measure. However, after controlling vocabulary the measures of Sound Isolation (initial sound) and Sound Isolation (final sound) were significantly correlated with the Single Word Reading scores.

Table 5.8

Correlations and Partial Correlations between Kindergarten (KG) English word reading (total score) and all the English measures used in KG study controlling for English vocabulary Test (PPVT)

Measures	Correlation	Partial Correlation
English Sound Isolation (initial sound)	.567**	.473**
English Sound Isolation (final sound)	.540**	.383**
English Sound Deletion	.271	.073
English Sound Blending	−.224	−.247
English Sentence Completion	.298*	.024
English Word Structure	.221	−.011
English Vocabulary Test	.497**	

Note. *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).*

5.5.2.3 Correlation and partial correlation analyses for Grade 1 Hindi

Table 5.9 presents the correlation and partial correlations controlling for Hindi Vocabulary of Hindi reading with the measures of phonological skills and morphological skills. These analyses suggest that once Hindi Vocabulary was controlled for, there were significant correlations between the participants' Hindi reading ability and the measures of Hindi Sound Isolation (final sound), Hindi Sound Blending, Hindi Sound Deletion, Hindi Sentence Completion and Hindi Word Structure.

Table 5.9

Correlations between Grade 1 Hindi word reading (total score) and all the Hindi measures used in Grade 1 study, with Partial Correlations controlling for Hindi Vocabulary Test.

Measures	Correlation	Partial Correlation
Hindi Sound Isolation (initial sound)	.434**	.283
Hindi Sound Isolation (final sound)	.524**	.430**
Hindi Sound Deletion	.646**	.538**
Hindi Sound Blending	.724**	.548**
Hindi Sentence Completion	.783**	.642**
Hindi Word Structure	.607**	.514**
Hindi Vocabulary Test	.717**	

Note. * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

5.5.2.4 Correlation and partial correlation analyses for Grade 1 English

Table 5.10 presents all the correlations with English Word Reading and the other English measures in the study. All the phonological and morphological measures were showing the association with English Single Word Reading. After controlling for vocabulary, the measures of Sound Isolation (final sound) and Sound Deletion were not correlated significantly with English reading measure. However, the measures of Sound Isolation (initial sound), Sound Blending, Sentence Completion and Word Structure were significantly correlated with the Single Word Reading scores.

Table 5.10

Correlations between Grade 1 English word reading (total score) and all the English measures used in Grade 1 study, with Partial Correlations controlling for English vocabulary Test (PPVT).

Measures	Correlation	Partial Correlation
English Sound Isolation (initial sound)	.466**	.475**
English Sound Isolation (final sound)	.365**	.287
English Sound Deletion	.378**	.234
English Sound Blending	.685**	.569**
English Sentence Completion	.584**	.360*
English Word Structure	.574**	.516**
English Vocabulary Test	.658**	

Note. * *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).*

5.5.2.5 Correlation and partial correlation analyses for Grade 2 Hindi

Table 5.11 shows of the correlations between Single Hindi Word Reading scores and the other measures in the study. All measures significantly correlated with reading levels. Partial correlations were found in controlling for Hindi vocabulary, between the reading measure and the measures of phonological and morphological skills. These analyses suggest that once Hindi vocabulary was controlled for, there were significant correlations between the participants' Hindi reading ability and the measures of Sound Isolation (final sound), Sound Deletion, Sound Substitution and Base Word. After controlling vocabulary, the measure of Sound Isolation (initial sound) and Word Structure did not show a significant correlation with Hindi Single Word Reading.

Table 5.11

Correlations between Grade 2 Hindi word reading (total score) and all the Hindi measures used in Grade 2 study, with Partial Correlations controlling for Hindi Vocabulary Test.

Measures	Correlation	Partial Correlation
Hindi Sound Isolation (initial sound)	.443**	.318
Hindi Sound Isolation (final sound)	.528**	.546**
Hindi Sound Deletion	.645**	.642**
Hindi Sound Substitution	.617**	.634**
Hindi Base Word	.680**	.641**
Hindi Word Structure	.396**	.332
Hindi Vocabulary Test	.543**	

Note. *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).*

5.2.2.6 Correlation and partial correlation analyses for Grade 2 English

Table 5.12 presents the correlations between English Single Word Reading and the other measures in the study; all were significant. The partial correlations, controlling for English Vocabulary, between English reading and the measures of phonological skills and morphological skills. These analyses suggest that once English vocabulary was controlled for; there were significant correlations between the participants' English reading ability and the measures of Sound Isolation (final sound), Sound Deletion, and Sound Substitution. After controlling vocabulary, the measure of Sound Isolation (initial sound), Base Word and Word Structure did not show a significant correlation with English Single Word Reading.

Table 5.12

Correlations between Grade 2 English word reading (total score) and all the English measures used in Grade 2 study, with Partial Correlations controlling for English Vocabulary Test (PPVT).

Measures	Correlation	Partial Correlation
English Sound Isolation (initial sound)	.490**	.212
English Sound Isolation (final sound)	.570**	.392*
English Sound Deletion	.469**	.470**
English Sound Substitution	.600**	.388*
English Base Word	.574**	.272
English Word Structure	.461**	.330
English Vocabulary Test	.793**	

Note. *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).*

5.5.2.7 Correlation and partial correlation analyses for Grade 3 Hindi

Table 5.13 presents the correlations between the Hindi Single Word Reading and the other measures in the study. All correlations are significant. Table 5.13 also presents partial correlations, controlling for Hindi Vocabulary, between Hindi reading and the measures of phonological skills and morphological skills. These analyses suggest that once Hindi Vocabulary was controlled for, there were still significant correlations between the participants' Hindi reading ability and the other measures in this study.

Table 5.13

Correlations between Grade 3 Hindi word reading (total score) and all the Hindi measures used in Grade 3 study, with Partial Correlations controlling for Hindi Vocabulary Test.

Measures	Correlation	Partial Correlation
Hindi Sound Isolation (initial sound)	.434**	.422**
Hindi Sound Isolation (final sound)	.535**	.504**
Hindi Sound Deletion	.621**	.588**
Hindi Sound Substitution	.642**	.562**
Hindi Base Word	.723**	.673**
Hindi Word Structure	.534**	.458**
Hindi Vocabulary Test	.517**	

Note. *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).*

5.5.2.8 Correlation and partial correlation analyses for Grade 3 English

Table 5.14 presents correlations between English Single Word Reading and the other measures in the study. All were significant. These analyses suggest that once English Vocabulary was controlled for Grade 3 participants' reading ability was significantly correlated with all the other measures except Word Structure.

Table 5.14

Correlations between Grade 3 English word reading (total score) and all the English measures used in Grade 3 study, with Partial Correlations controlling for English Vocabulary Test.

Measures	Correlation	Partial Correlation
English Sound Isolation (initial sound)	.537**	.367**
English Sound Isolation (final sound)	.507**	.344*
English Sound Deletion	.598**	.426**
English Sound Substitution	.494**	.344*
English Base Word	.554**	.348*
English Word Structure	.462**	.283
English Vocabulary Test	.771**	

Note. *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).*

The results obtained from the correlation and partial correlation analyses above argue for the phonological and morphological awareness skills relationship with the Hindi and English word reading. This significant positive relationship suggested that when the children's morphological awareness increased, the probability of better performance in Hindi reading ability also increased. In contrast, for English, the larger correlations were found between the English phonological measures and English word reading. This difference will be discussed later in the thesis.

Summary

Concerning research question 1, the results of correlational analyses indicated that all kindergarten (KG) Hindi measure variables significantly positively correlated. Once the results for the KG Hindi group were controlled for Hindi vocabulary, there were significant correlations between the participants' Hindi reading ability and the measures of Sound Isolation (final sound), Sentence Completion, and Word Structure. For KG English, the measures of Sound Isolation (initial sound), Sound Isolation (final sound) and Sentence Completion were significantly correlated with word reading but once English vocabulary was controlled, there were significant correlations between the English word reading and the measures of Sound Isolation (initial sound) and Sound Isolation (final sound). In Grade 1 Hindi, all Hindi measures significantly correlated. Even when controlling the Hindi vocabulary, all the measures again showed significant correlation with Hindi word reading except Hindi Sound Isolation (initial sound). In Grade 1 English, all the English measures were significantly correlated with English word reading. However, once vocabulary was controlled for, the measures of Sound Isolation (initial sound), Sound Blending, Sentence Completion, and Word Structure were significantly correlated with English word reading. In Grade 2 Hindi, all the phonological and morphological awareness measures significantly correlated with Hindi word reading. After controlling for vocabulary, the measure of Sound Isolation (initial sound) and Word Structure did not show a significant correlation with Hindi word reading. For Grade 2 English, all measures were significantly correlated, although when controlling vocabulary, the measure of Sound Isolation (final sound), Sound Deletion and Sound Substitution were showing the significant correlation with English word reading. In Grade 3, both Hindi and English results showed a significant correlation between word reading and all phonological and morphological awareness measures used in this study. After controlling for vocabulary, again, there was a significant correlation between all the independent measure variables and

the dependent variable (Hindi and English word reading) except between English Word Structure measure and English word reading.

5.5.3 Regression Analyses

Results from the correlational analyses demonstrated association between word reading and phonological awareness, and between word reading and morphological awareness. However, additional analyses were performed to investigate whether morphological and phonological awareness predict variability in word reading independent of each other and the influence of vocabulary in Hindi and in English. These involved regression analyses using either Hindi or English word reading measures as the dependent variable. Measures of phonological awareness and morphological awareness in Hindi and English used as independent variables, with the aim being to identify the best set of variables predicting variance in reading. For this purpose, phonological and morphological variables entered into the regression following a stepwise process. For the first set of analyses, only gender was controlled, but for the second both gender and vocabulary (Hindi and English) were controlled in order to test whether phonological, and morphological skills explained additional variability over that explained by vocabulary.

Given that gender has an influence on language skills (Goh & Foong, 1997; McKay & Wong, 1996; Siebert, 2003), gender of participants was entered into the model each time in the first step to act as a control. Similar regression analyses procedures were followed for both Hindi and English languages. Sets of regression analyses were performed on the data from KG to Grade 3, with analyses either including or excluding vocabulary to assess its effect on the predictor variables. These aimed to assess the contribution of phonological and morphological awareness within L1 (Hindi) and L2 (English) reading ability. Standardised beta scores were also calculated to determine the association between each independent and dependent variable controlling for all other measures in the final regression model.

5.5.3.1 KG regression analyses

The first regression analysis focused on the ability of Hindi morphological and phonological awareness to predict variance in L1 word reading. In this regression, Single Word Reading measure was used as the dependent variable, with Sound Isolation (initial sound) Sound Isolation (final sound), Sound Deletion, Sound Blending, Sentence Completion and Word Structure entered as independent variables and using a stepwise procedure, after controlling for the influence of gender. Table 5.15 reports the regression analysis results indicating that, after controlling for gender, only the morphological awareness measures significantly predicted the participants' ability of Hindi word reading.

Table 5.15

Results of regression analysis on KG data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.001	.001	F=.035 $p =.852$	Gender	-.016
2. S. Morphological Awareness	.758	.758	F=147.44 $p <.001$	Sentence Completion	.654
3. S. Morphology Awareness	.796	.038	F=8.48 $p <.006$	Word Structure	.291

Note. E: Enter method. S: Stepwise method.

As can be seen from table 5.15, the Sentence Completion measure explained approximately 76% of the variance in word reading, while the Word Structure measure explained an additional

4% of the variance. Combined, morphological awareness accounted for approximately 80% of the variance in KG Hindi Single Word Reading. A second regression analysis followed the format of the first except that Vocabulary was controlled in addition to gender. The results can be found in Tables 5.16.

Table 5.16

Results of regression analysis on KG data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading, controlling Hindi vocabulary

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.001	.001	F = .035 p = .852	Gender	−.015
2. E. Hindi Vocabulary	.524	.523	F = 51.66 p <.001	Hindi Vocabulary	.109
3. S. Morphological Awareness	.768	.244	F=48.35 p <.001	Sentence Completion	.583
4. S. Morphological Awareness	.801	.033	F=7.47 p <.009	Word Structure	.267

Note. E: Enter method. S: Stepwise method.

The results indicated that vocabulary produced a statistically significant outcomes, explaining about 52% of the variance in word reading. However, the morphological awareness tasks also produced statistically significant results and explaining a further 28% of the variance in word reading beyond that of L1 vocabulary. Furthermore, vocabulary produced a relatively small

beta value (β = .109), whereas the beta scores for the Sentence Completion (β = .583) and the Word Structure (β = .267) were larger. Overall, the findings indicated that Kindergarten (KG) L1 word reading was predicted by morphological awareness somewhat independent of the influence of L1vocabulary; though the second regression analysis also indicates that there is a common level of explanation between the vocabulary and morphology measures. Similar analyses were performed for the KG English measures. The analysis in Table 5.17 focused on KG L2 word reading, with the Single Word Reading total scores being used as the dependent variable and the L2 Sound Isolation (initial sound), Sound Isolation (final sound), Sound Deletion, Sound Blending, Sentence Completion and Word Structure measures being entered in a stepwise procedure, after controlling for the influence of gender.

Table 5.17

Results of regression analysis on KG data investigating the association between English phonological and morphological awareness measures and English reading

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.024	.024	$F = 1.18$ $p = .281$	Gender	.123
2. S. Phonological Awareness	.332	.308	$F = 21.66$ $p < .001$	Sound Isolation (Initial Sound)	.407
3. S. Phonological Awareness	.453	.121	$F = 10.17$ $p < .003$	Sound Isolation (Final Sound)	.387
4. S. Phonological Awareness	.514	.061	$F = 5.63$ $p = .022$	Sound Blending	−.247

Note. E: Enter method. S: Stepwise method.

The results showed that KG L2 Sound Isolation (Initial Sound) explained approximately 31% of the variance in English reading. In addition, Sound Isolation (Final Sound) explained a further 12% and Sound Blending about a further 6% of the variance in KG L2 word reading. In total, phonological awareness accounted for approximately 50% of the variance in L2 word reading. In the second regression, the L2 word reading measure was again used as the dependent variable, but vocabulary was controlled along with gender. These results are displayed in Tables 5.18.

Table 5.18

Results of regression analysis on KG data investigating the association between English phonological and morphological awareness measures and English reading, controlling English Vocabulary

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.024	.024	F = 1.18 $p = .281$	Gender	.098
2. E. Vocabulary	.253	.229	F = 14.42 $p < .001$	PPVT	.181
3. S. Phonological Awareness	.420	.166	F = 13.20 $p < .001$	Sound Isolation (Initial Sound)	.373
4. S. Phonological Awareness	.479	.059	F= 5.10 $P = .029$	Sound Isolation (Final Sound)	.308
5. S. Phonological Awareness	.536	.057	F= 5.43 $p < .001$	Sound Blending	−.240

Note. E: Enter method. S: Stepwise method.

The findings showed that vocabulary explaining approximately 23% of the variance in L2 word reading. Sound Isolation (initial sound) explained a further 17% of the variance in English Word Reading, with Sound Blending explaining a further 6% of variance in the reading scores. Phonological awareness accounted for approximately 23% of the variance in KG L2 word reading. In contrast, phonological measure Sound Isolation (final sound) was not statistically significant with L2 word reading, but explained about 6% of the variance in L2 word reading and produced positive beta value ($\beta = .308$). This analyses suggest that phonological measure Sound Isolation (final Sound) may predict some level of the variability in L2 word reading.

The findings indicated that the phonological awareness explained additional variance in L2 word reading beyond that explained by L2 vocabulary. Additionally, Sound Isolation (Initial Sound) measures produced the beta value ($\beta = .373$), which was larger than that for the Vocabulary measure ($\beta = .181$). Therefore, it appears that these KG readers rely mainly on L2 phonological awareness skills to support English reading. However, the level of explanation of reading provided by the phonological measures was reduced by the inclusion of vocabulary, suggesting that there was common variance explained between vocabulary and phonology.

5.5.3.2 Grade 1 regressions

For the Grade 1 data, regression analyses were performed to determine associations between Grade 1 L1 reading and morphological/phonological awareness, along with the best set of predictors of Grade 1 L1 word reading. In the first regression, the Single Word Reading measure was used as the dependent variable with Sound Isolation (initial sound), Sound Isolation (final sound), Sound Deletion, Sound Blending, Sentence Completion and Word Structure entered using stepwise procedures, after controlling for the influence of gender. These results are displayed in Table 5.19.

Table 5.19

Results of regression analysis on Grade 1 data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.006	.006	F = .289 p = .593	Gender	−.015
2. S. Morphological Awareness	.617	.612	F = 81.56 p < .001	Sentence Completion	.327
3. S. Phonological Awareness	.716	.099	F = 17.36 p < .001	Sound Blending	.354
4. S. Phonological Awareness	.753	.037	F = 7.43 p < .009	Sound Deletion	.258
5. S. Phonological Awareness	.790	.036	F = 8.28 p < .006	Sound Isolation (final sound)	.213

Note. E: Enter method. S: Stepwise method.

The results demonstrated that, after controlling for gender, L1 Hindi morphological awareness (Sentence Completion) explained 61% of the variance in L1 word reading. This was followed by Sound Blending, which explained an additional 10% of the variance in L1 word reading. Sound Deletion and Sound Isolation (final sound) were entered following the first two measures, and each explained a further 4% of the variance in L1 word reading. In total, morphological awareness accounted for 61% while phonological awareness accounted for 17%

of variability in L1 word reading. A second regression followed the procedures of the first except that it also controlled for the influence of Vocabulary. For the results, see Table 5.20.

Table 5.20

Results of regression analysis on Grade 1 data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading, controlling Hindi vocabulary

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.006	.006	$F = .289$ $p = .593$	Gender	.001
2. E. Vocabulary	.520	.515	$F = 54.70$ $p < .001$	Vocabulary	.247
3. S. Morphological Awareness	.720	.200	$F = 35.58$ $p < .001$	Sentence Completion	.257
4. S. Phonological Awareness	.766	.047	$F = 9.79$ $p < .003$	Sound Blending	.271
5. S. Phonological Awareness	.796	.029	$F = 6.84$ $p = .012$	Sound Deletion	.231
6. S. Phonological Awareness	.824	.029	$F = 7.66$ $p < .008$	Sound Isolation (final sound)	.190

Note. E: Enter method. S: Stepwise method.

The results showed that vocabulary explained approximately 51% of the variance in word reading. However, morphological awareness explained a further 20% of the variance in word

reading beyond that explained by L1 vocabulary. The phonological awareness measures also explained additional variability: Sound Blending explaining about 5% of variance in L1 word reading, followed by Sound Deletion and Sound Isolation (final sound) which each explained an additional 3% of word reading variance, however Sound deletion was not statistically significant. Therefore, phonological awareness accounted for 8% of the variance in L1 word reading.

Overall, the findings indicated that Grade 1 Hindi word reading was best predicted by the Sentence Completion morphological awareness task, and this task predicted variance over and above that explained by vocabulary. However, the phonological awareness measures also predicts variance in word reading independent of morphology and the influence of L1 vocabulary. The variance explained by both L1 morphological awareness and L1 phonological awareness both reduced once vocabulary was controlled, suggesting that they also share some common variability with reading.

Regression analyses were also performed to assess the relationship between L2 phonological and morphological awareness and L2 word reading. In the first regression, the Single Word Reading measure was used as the dependent variable with Sound Isolation (initial sound), Sound Isolation (final sound), Sound Deletion, Sound Blending, Sentence Completion and Word Structure entered after controlling for the influence of gender. These results are displayed in Table 5.21.

Table 5.21

Results of regression analysis on Grade 1 data investigating the association between English phonological and morphological awareness measures and English reading

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.012	.012	F = .652 *p* = .423	Gender	.086
2. S. Phonological Awareness	.491	.479	F = 47.94 *p* < .001	Sound Blending	.501
3. S. Morphological Awareness	.625	.134	F = 17.88 *p* < .001	Word Structure	.300
4. S. Phonological Awareness	.711	.086	F = 14.56 *p* < .001	Sound Isolation (initial sound)	.317
5. S. Phonological Awareness	.790	.025	F = 4.52 *p* = .039	Sound Deletion	.167

Note. E: Enter method. S: Stepwise method.

The results demonstrated that phonological awareness (Sound Blending) accounted for approximately 48% of the variance in L2 word reading. However, morphological awareness (Word Structure) was also significant and explained about 13% of additional variability in Word reading. Phonological awareness measures; Sound Isolation (initial sound) and Sound Deletion also added to the level of variance explained in L2 word reading: the former with 9% and the latter an additional 2%. However, Sound Deletion did not show the significant contribution with L2 word reading, but produced positive beta value (β = .167) might predict

some amount of the variability. Therefore, altogether phonological awareness accounted for 56% of the variance while morphological awareness explained about 13% of variance in L2 word reading. In the second regression, the same stepwise procedure was followed but this time after controlling for the influence of gender and vocabulary knowledge. Results are displayed in Table 5.22.

Table 5.22

Results of regression analysis on Grade 1 data investigating the association between English phonological and morphological awareness measures and English reading, controlling English Vocabulary

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.012	.012	F = .652 *p* = .423	Gender	.086
2. E. Vocabulary	.444	.432	F = 39.60 *p* < .001	PPVT	.336
3. S. Phonological Awareness	.634	.190	F = 26.03 *p* < .001	Sound Blending	.400
4. S. Phonological Awareness	.729	.095	F = 17.17 *p* <.001	Sound Isolation (initial sound)	.279
5. S. Morphological Awareness	.796	.066	F = 15.55 *p* < .001	Word Structure	.281

Note. E: Enter method. S: Stepwise method.

The findings indicated that vocabulary explained approximately 43% of the variance in L2 word reading. Sound Blending explained a further 19% of the variance in word reading, with

Sound Isolation, initial sound, explaining an additional 9% of the variance. In addition, morphological awareness (Word Structure) also entered the regression model this time, and explained approximately an additional 6 % of the variance in word reading. However, after controlling vocabulary, the measure of Sound Deletion dropped from the regression analyses.

The findings indicated that the phonological awareness explained a considerable amount of variance in L2 word reading beyond that of L2 vocabulary, despite vocabulary making a significant contribution to word reading. In addition, there was a considerable amount of common variance explained by vocabulary and phonological awareness. Controlling for vocabulary also led to morphological processing also adding explanation to the model. These results will be discussed further.

5.5.3.3 Grade 2 regressions

The next set of regression analyses was performed on the Grade 2 children. The Single Word Reading measure was the dependent variable in both the Hindi and English analyses. For the first regressions, only the participants' genders were entered into the model in the first step to control for the influences of gender. The morphological and phonological measures were then entered using a stepwise procedure. In the second regressions, the vocabulary measure was also entered as a second step to control the influence of vocabulary, followed by the phonological and morphological awareness measures. The results for the first regression involving the Hindi measures are displayed in Table 5.23.

Table 5.23

Results of regression analysis on Grade 2 data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.001	.001	$F = .025$ $p = .874$	Gender	$-.048$
2. S. Morphological Awareness	.469	.469	$F = 43.27$ $p < .001$	Base Word	.405
3. S. Phonological Awareness	.565	.096	$F = 10.57$ $p < .002$	Sound Deletion	.362
4. S. Phonological Awareness	.609	.044	$F = 5.23$ $p = .027$	Sound Isolation (initial sound)	.222

Note. E: Enter method. S: Stepwise method.

The results obtained from this analysis indicated that the measure of Hindi morphological awareness (Base Word) explained about 47% of the variance in Hindi word reading. In addition, phonological awareness also contributes to the L1 word reading, explaining an additional 10% (Sound Deletion) of variance in word reading. The phonological measure (Sound Isolation, initial sound) did not show significance, however explained 4% of the variance and produced positive beta value ($\beta = .222$) which may predict a small amount of variability in word reading.

The results of the second regression, now also controlling vocabulary are displayed in Table 5.24.

Table 5.24

Results of regression analysis on Grade 2 data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading, controlling Hindi Vocabulary

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.001	.001	F = .025 *p* = .874	Gender	-.042
2. E. Vocabulary	.295	.295	F = 20.50 *p* < .001	Vocabulary	.358
3. S. Morphological Awareness	.590	.295	F = 34.47 *p* < .001	Base Word	.253
4. S. Phonological Awareness	.675	.085	F = 12.25 *p* < .001	Sound Deletion	.294
5. S. Phonological Awareness	.711	.036	F = 5.81 *p* = .020	Sound Substitution	.250

Note. E: Enter method. S: Stepwise method.

The results showed that vocabulary explained about 29% of the variance in word reading, but morphological awareness (Base Word) explained a further 29% of the variance in word reading in addition to vocabulary. In addition to morphological awareness, Sound Deletion explained about 8-9% of the variance, and Sound Substitution added a further 4% to the explanation of variance in Hindi word reading. However, phonological measure Sound Substitution was not significantly associated with L1 word reading, it produced positive beta value (β = .250) which may predict the variability in L1 reading. In addition, once vocabulary was controlled, Sound

Isolation (initial sound) dropped from the regression and was replaced by the Sound Substitution measure.

The findings suggest that vocabulary, morphological awareness and phonological awareness each make a contribution to Hindi Word reading at this level of school – each of the three areas also produced similar beta scores. The level of variability explained by the morphological awareness measure was reduced by the addition of vocabulary, suggesting that they do share some common variability with reading.

Overall, the analyses suggested a contribution of Grade 2 Hindi morphological awareness in Hindi word reading independent of vocabulary knowledge, though there is also some overlap with vocabulary knowledge. On the other hand, the analyses found that Hindi phonological awareness also contributed to word reading independent of vocabulary knowledge and morphological awareness.

Table 5.25

Results of regression analysis on Grade 2 data investigating the association between English phonological and morphological awareness measures and English reading

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.000	.000	F = .000 p = .994	Gender	.079
2. S. Phonological Awareness	.361	.361	F = 27.69 p < .001	Sound Substitution	.268
3. S. Phonological Awareness	.500	.139	F = 13.36 p < .001	Sound Isolation (final sound)	.228
4. S. Morphological Awareness	.589	.089	F = 10.19 p < .001	Base Word	.266
5. S. Morphological Awareness	.632	.043	F = 5.37 p < .001	Word Structure	.253
6. S. Phonological Awareness	.679	.047	F = 6.55 p < .014	Sound Isolation (initial sound)	.243

Note. E: Enter method. S: Stepwise method.

Table 5.25 presents the results for the analysis of the Grade 2 English Word reading measure. Sound Substitution accounted for approximately 36% of the variance in English word reading. Sound Isolation (final sound)) was also significant and explained an additional 14% of the variability. Morphological awareness (Base Word) explained a further 9% of the variance in word reading, and morphological awareness (Word Structure) added 4% to the prediction of

the variance in English reading. Sound Isolation (initial sound) also explained an additional 5% of variance which was not significantly contributed with English word reading. Sound Isolation (initial sound) produced a positive beta value (β = .243) which was larger than Sound Isolation (final sound) β = .228. This suggested that Sound Isolation (initial sound) may predict the variability in L2 word reading. Hence, overall phonological awareness accounted for 51% of variance while morphological awareness explained about 13% of variance in the English word reading. The results of the second regression, controlling for the influence of gender and vocabulary are displayed in Table 5.26.

Table 5.26

Results of regression analysis on Grade 2 data investigating the association between English phonological and morphological awareness measures and English reading, with vocabulary controlled

Variables	R^2	R^2 Change	Sig. R^2 Change	Final Beta	
1. E. Gender	.000	.000	F = .000 p = .994	Gender	.085
2. E. Vocabulary	.634	.634	F = 84.92 p < .001	PPVT	.649
3. S. Phonological Awareness	.716	.082	F = 13.88 p <.001	Sound Deletion	.248
4. S. Phonological Awareness	.747	.031	F = 5.79 p = .020	Sound Isolation (Final Sound)	.205

Note. E: Enter method. S: Stepwise method.

In this analysis, vocabulary had a major impact on the results. Vocabulary explaining approximately 63% of the variance in English word reading. However, two phonological awareness (Sound Deletion and Sound Isolation, final sound) also explained additional variance in word reading (8% and 3% respectively). The phonological measure Sound Isolation (final sound) was not statistically significant but produced positive beta value (β = .205), which may suggest some level of the variance in L2 word reading.

Based on the above analyses, vocabulary is an important factor and seems to share a large amount of variance with both phonological and morphological measures when predicting variability in English Word reading; though the beta scores for the phonological measures suggest some independence from vocabulary as well.

5.5.3.4 Grade 3 regressions

Table 5.27 reports the results of the Grade 3 Hindi word reading regression analysis controlling for gender alone.

Table 5.27

Results of regression analysis on Grade 3 data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.100	.100	F = 6.13 *p* = .016	Gender	.114
2. S. Morphological Awareness	.567	.466	F = 58.13 *p* < .001	Base Word	.481
3. S. Phonological Awareness	.663	.097	F = 15.21 *p* < .001	Sound Isolation (final sound)	.245
4. S. Phonological Awareness	.727	.063	F = 12.06 *p* < .001	Sound Isolation (initial sound)	.236
5. S. Phonological Awareness	.770	.043	F = 9.58 *p* < .003	Sound Deletion	.245

Note. E: Enter method. S: Stepwise method.

As shown in Table 5.27, morphological awareness (Base Word) accounted for 47% of variance in Hindi word reading. In addition, Sound Isolation (final sound) explained a further 10% of variance, Sound Isolation (initial sound) explained an additional 6%, and Sound Deletion explained approximately an additional 4% of variance in word reading. Total phonological awareness accounted for approximately 20% of variability in Hindi word reading.

In order to investigate further, Hindi vocabulary was entered in step two to control the influence

of vocabulary after controlling gender. The results of these regression analysis are presented in

Table 5.28.

Table 5.28

Results of regression analysis on Grade 3 data investigating the association between Hindi phonological and morphological awareness measures and Hindi reading, with vocabulary controlled

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.100	.100	F = 6.13 p =.016	Gender	.116
2. E. Vocabulary	.342	.241	F = 19.71 p < .001	Vocabulary	.214
3. S. Morphological Awareness	.639	.297	F = 43.63 p <.001	Base Word	.421
4. S. Phonological Awareness	.718	.079	F = 14.63 p < .001	Sound Isolation (final sound)	.225
5. S. Phonological Awareness	.772	.054	F = 12.01 p < .001	Sound Isolation (initial sound)	.221
6. S. Phonological Awareness	.809	.037	F= 9.69 p < .003	Sound Deletion	.227

Note. E: Enter method. S: Stepwise method.

The results showed that vocabulary explained about 24% of the variance in word reading. Morphological awareness (Base Word) was still statistically significant and explaining a further 30% of the variance in word reading beyond that of L1 vocabulary. The phonological measures still explained additional variances in Hindi reading as well: Sound Isolation (final sound) explained about 8% of variance, Sound Isolation (initial sound) accounted for about 5% of variance, and Sound Deletion explained an additional 4% of variability in Hindi word reading. In total phonological awareness accounted for approximately 17% of the variance in Hindi word reading after controlling for vocabulary.

The results of these analyses suggest that of the measures included in the current study, the morphological awareness measure (Base Word) may exert the larger influence on Hindi Word reading at this stage of learning. Although vocabulary made a significant contribution to word reading, the morphological awareness measure explained additional variability and produce the larger beta value ($\beta = .421$), compared to vocabulary ($\beta = .214$). However, there was common variability explained across the two measures, suggesting that vocabulary and morphology share variability with word reading. In addition to morphological awareness and vocabulary knowledge, phonological awareness also explained significant levels of variability in Hindi word reading; and this seemed to be less influenced by the addition of vocabulary into the regression model.

Overall, the result shows that the Grade 3 Hindi word reading is best predicted by morphological awareness, but that both vocabulary knowledge and phonological awareness also explain variability.

Similar regression analyses were performed to explain variability in English word reading in Grade 3. The results of the first analysis controlling only gender are displayed in Table 5.29.

Table 5.29

Results of regression analysis on Grade 3 data investigating the association between English phonological and morphological awareness measures and English reading

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.084	.084	F = 5.06 $p = .028$	Gender	.092
2. S. Phonological Awareness	.401	.316	F = 28.50 $p < .001$	Sound Deletion	.421
3. S. Phonological Awareness	.555	.155	F = 18.43 $p < .001$	Sound Isolation (Final Sound)	.358
4. S. Morphological Awareness	.627	.071	F = 9.91 $p < .003$	Base Word	.300

Note. E: Enter method. S: Stepwise method.

Sound Deletion explained about 32% of variance, with Sound Isolation (final sound) explaining a further 15-16% of variability in English word reading morphological awareness (Base Word) also explained an additional 7% of the variance in English word reading.

In the second regression, both gender and vocabulary were controlled. Results are displayed in Table 5.30.

Table 5.30

Results of regression analysis on Grade 3 data investigating the association between English phonological and morphological awareness measures and English reading, controlling English Vocabulary

Variables	R²	R² Change	Sig. R² Change	Final Beta	
1. E. Gender	.084	.084	F = 5.06 p = .028	Gender	.035
2. E. Vocabulary	.600	.516	F = 69.63 p < .001	PPVT	.452
3. S. Phonological Awareness	.673	.073	F = 11.81 p < .001	Sound Deletion	.280
4. S. Phonological Awareness	.723	.050	F = 9.36 p < .003	Sound Isolation (Final Sound)	.235
5. S. Morphological Awareness	.748	.025	F = 5.00 p = .030	Base Word	.185

Note. E: Enter method. S: Stepwise method.

The results of this regression analysis indicated that vocabulary explained 52% of the variability in English word reading. The measure of Sound Deletion explained an additional 7% of variance, and Sound Isolation (final sound) explained a further 5% of variability in English word reading. In addition, morphological awareness (Base Word) predicts added 2% to the variability explained. Once control the vocabulary, the morphological measure Base Word did not show the significance with L2 word reading.

As with the Grade 3 analyses, the addition of English vocabulary had a large impact on the variability in Word reading explained by the phonological awareness measures. Nevertheless, in the regression analysis without vocabulary, phonological awareness explained about 47% of variance in word reading. When vocabulary was controlled, however, phonological awareness explained about 12% of the variance. This suggests that phonological awareness shares a large amount of variability in common with vocabulary when considering its association with English word reading ability. This point will be discussed further in the next chapter.

Summary

These analyses investigated to answer question 2, to examine the morphological and phonological skills as potential predictors of Hindi L1 and English L2 word reading. The Hindi and English measures were analysed with hierarchical multiple regression with or without controlling vocabulary. KG results indicated that the main predictors of Hindi L1, with vocabulary and without vocabulary are Sentence Completion and Word Structure. KG English results indicated the measure variables independent of Vocabulary and via vocabulary: Sound Isolation (initial sound), Sound Isolation (final sound), and Sound Blending – although a negative beta value was produced between the blending of sounds measure and English word reading. This suggests that isolation of letter sound and blending of alphabets in L2 at this early stage can influence the Hindi-English bilingual learners' L2 reading ability. In Grade 1, the main predictors of Hindi L1, with or without vocabulary: Sentence Completion, Sound Blending, Sound Deletion and Sound Isolation (final sound). For Grade 1 English, the main predictors were Sound Blending, Sound Isolation (initial sound), Word Structure, and Sound Deletion. Once vocabulary was controlled for, the main predictors were Sound Blending, Isolation (initial sound), and Word Structure. Sound Deletion dropped from the analyses once vocabulary was controlled. The regression analyses of Grade 2 Hindi indicate the main

predictors: Base Word, Sound Deletion, and Sound Isolation (initial sound). After controlling for vocabulary the Sound Isolation (initial sound) dropped from the regression and Sound Substitution came up as a predictor. Therefore, even after controlling vocabulary, a morphological awareness measure (Base Word) still covered a large proportion of Hindi word reading. In Grade 2 English, the best set of predictors were Sound Substitution, Sound Isolation (final sound), Base Word, Word Structure and Sound Isolation (initial sound). Once vocabulary was controlled for, the only predictors left in the regression analyses were Sound Deletion and Sound Isolation (final sound). Vocabulary played a crucial role in Grade 2 English word reading. In Grade 3 regression analyses of Hindi L1, the best predictors were, independent of vocabulary and via vocabulary: Base Word, Sound Isolation (initial sound), Sound Isolation (final sound) and Sound Deletion. Again, in Grade 3 English, the predicted measures were the same, with or without controlling vocabulary; the predictors were Sound Deletion, Sound Isolation (final sound) and Base Word. The findings indicated that according to the percentage of variance in L1 Hindi, morphological awareness mainly contributed to L1 Hindi word reading. Nevertheless, L1 phonological awareness explained variability in the L1 word reading measure, to some extent, independent of vocabulary knowledge and via vocabulary knowledge. However, the L1 morphological awareness plays a major role in L1 word reading and L2 phonological awareness was predicted a large proportion in L2 word reading.

5.6 Influence of L1 Hindi morphological and phonological skills on L2 English word reading

The third research question was designed to investigate whether L1 Hindi skills predict independent variability in L2 English word reading. To answer this research question, hierarchical multiple regression analyses were performed to assess the ability of Hindi phonological and morphological measures in predicting English word reading.

5.6.1 Influence of L1 Hindi phonological and morphological awareness on L2 English word reading, in Kindergarten (KG)

A hierarchical regression analysis performed to assess the ability of Hindi phonological and morphological skills in predicting English word reading. In this analysis, the measure of English word reading used as the dependent variable, while the measures of Hindi phonological and morphological awareness were used as the independent variables. Potential predictor variables of English were then entered in a prescribed order. The genders of the participants and English vocabulary were entered to control for the effects of the variables. Table 5.31 presents the results of this hierarchical regression analysis.

Table 5.31

Results of regression analysis on KG data investigating the influence of L1 Hindi phonological and morphological awareness on L2 English reading, controlling for English Vocabulary and English predictor measures

Variables	R^2	R^2 Change	Sig. R^2 Change	Final model beta values (with p-value in brackets)	
1. Gender	.024	.024	F= 1.18 $p = .281$	Gender	.104 (.356)
2. English Vocabulary	.253	.229	F= 14.42 $p <.001$	Vocabulary	.103 (.499)
3. English Predictor Measures	.536	.283	F= 8.94 $p <.001$	Sound Isolation (Initial Sound)	.342 (.008)
				Sound Isolation (Final Sound)	.150 (.338)
				Sound Blending	-.106 (.407)
4. Hindi Measures	.595	.059	F= .923 $P = .490$	Sound Isolation (Initial Sound)	-.080 (.510)
				Sound Isolation (Final Sound)	.132 (.549)
				Sound Deletion	-.122 (.477)
				Sound Blending	.016 (.905)
				Sentence Completion	.233 (.344)
				Word Structure	.126 (.456)

Results obtained from this analysis indicated that English vocabulary was statistically significant, explaining approximately 23% of variances in English word reading. English predictor measures were also statistically significant, explaining approximately 28% of variances in English word reading. Additionally, the results demonstrated that Hindi measures

were non-significant, however, explaining approximately an additional 6% of the variance in English word reading. It is interesting that this is about the amount explained in the other grades too. The Hindi morphological awareness measure (Sentence Completion) explained additional variability and produce the beta value (β = .233) which suggests that this measure may be associated with English word reading after controlling for the English measures, though it is an additional variability in English word reading after controlling for the English measures.

5.6.2 Influence of L1 Hindi phonological and morphological awareness on L2 English word reading, in Grade 1

A similar hierarchical regression analysis was also performed to assess the ability of Hindi measures in predicting English word reading using the word reading measure as the dependent variable and entering the potential predictor variables in the same prescribed order. First, the gender of each participants was entered into the model. Next, vocabulary was entered at the second step to control for the influences of these variables. English vocabulary measure explained about 43% of variability in English word reading. The English predictor measures were entered in step 03 and explained about 35% of the variance in English word reading. Finally, the Hindi measures were entered in step 04, they explained 7% of the variance in English word reading. These results are displayed in Table 5.32.

Table 5.32

Results of regression analysis on Grade 1 data investigating the influence of L1 Hindi phonological and morphological awareness on L2 English reading, controlling for English Vocabulary and English predictor measures

Variables	R²	R² Change	Sig. R² Change	Final model beta values (with p-value in brackets)	
1. Gender	.012	.012	F= .652 *p* = .423	Gender	.049 (.444)
2. English Vocabulary	.444	.432	F= 39.60 *p* <.001	Vocabulary	.151 (.089)
3. English Predictor Measures	.796	.351	F= 27.50 *p* <.001	Sound Blending	.208 (.031)
				Sound Isolation (Initial Sound)	.223 (.001)
				Word Structure	.245 (.001)
4. Hindi Measures	.861	.066	F= 3.30 *p* <.009	Sound Isolation (Initial Sound)	.138 (.055)
				Sound Isolation (Final Sound)	.045 (.599)
				Sound Deletion	.203 (.013)
				Sound Blending	.095 (.317)
				Sentence Completion	-.009 (.937)
				Word Structure	.165 (.045)

The results obtained from this analysis indicated that the Vocabulary and English predictor measures were statistically significant. The measures of Hindi morphological and phonological awareness were statistically significant at the *p* <.009 level. The measure of Hindi phonological measure (Sound Deletion) produce the beta value (β = .203) and Hindi morphological measure (Word Structure) produce the beta value (β = .165) which may suggest some level of association of these measures after controlling for the English measures.

5.6.3 Influence of L1 Hindi phonological and morphological awareness on L2 English word reading, in Grade 2

In Grade 2, similar regression analyses were performed to explain variability in English word reading. The results of the analysis controlling gender and English vocabulary are displayed in Table 5.33.

Table 5.33

Results of regression analysis on Grade 2 data investigating the influence of L1 Hindi phonological and morphological awareness on L2 English reading, controlling for English Vocabulary and English predictor measures

Variables	R^2	R^2 Change	Sig. R^2 Change	Final model beta values (with p-value in brackets)	
1. Gender	.000	.000	F= .000 $p = .994$	Gender	.048 (.507)
2. English Vocabulary	.634	.634	F= 84.92 $p <.001$	Vocabulary	.468 (.001)
3. English Predictor Measures	.747	.113	F= 10.53 $p <.001$	Sound Deletion	.138 (.116)
				Sound Isolation (Final Sound)	.180 (.040)
4. Hindi Measures	.800	.053	F= 1.79 $P = .124$	Sound Isolation (Initial Sound)	.084 (.322)
				Sound Isolation (Final Sound)	.104 (.234)
				Sound Deletion	.143 (.120)
				Sound Substitution	.009 (.928)
				Base Word	.053 (.632)
				Word Structure	.102 (.213)

Results showed that the measure of English vocabulary was statistically significant and explained about 63% of the variance and further English predictor measures explained about 11% of the variance in English word reading. In addition, the measures of Hindi were not statistically significant. However, they explained 5% of the variance in the English word reading. The Hindi measure (Sound Deletion) produced the beta value ($\beta = .143$) that was the larger value than other Hindi measures, which may not predict the variability after controlling for the English measures.

5.6.4 Influence of L1 Hindi phonological and morphological awareness on L2 English word reading, in Grade 3

Similar regression analyses were performed for Grade 3 analyses controlling for the influence of Gender and vocabulary to explain variability in English word reading. The results of the analysis are displayed in Table 5.34.

Table 5.34

Results of regression analysis on Grade 3 data investigating the influence of L1 Hindi phonological and morphological awareness on L2 English reading, controlling for English Vocabulary and English predictor measures

Variables	R²	R² Change	Sig. R² Change	Final model beta values (with p-value in brackets)	
1. Gender	.084	.084	F= 5.06 $p = .028$	Gender	.033 (.623)
2. English Vocabulary	.600	.516	F= 69.63 $p < .001$	Vocabulary	.309 (.002)
3. English Predicted Measures	.748	.148	F= 9.94 $p < .001$	Sound Deletion	.110 (.208)
				Sound Isolation (Final Sound)	.101 (.176)
				Base Word	.129 (.106)
4. Hindi Measures	.836	.088	F= 4.03 $p < .005$	Sound Isolation (Initial Sound)	.076 (.282)
				Sound Isolation (Final Sound)	.074 (.385)
				Sound Deletion	.218 (.011)
				Sound Substitution	-.052 (.581)
				Base Word	.283 (.005)
				Word Structure	.034 (.679)

Table 5.34 reports the influence of L1 phonological and morphological skills on L2 word reading. Results obtained from this analysis indicated that vocabulary measure was statistically significant and explained the variability about 52% in English word reading. English measures were statistically significant, explaining approximately 15% percent of the variance in English

word reading comprehension. Furthermore, the results demonstrated that Hindi measures were also statistically significant, explaining approximately an additional 9% of the variance in English word reading. The Hindi morphological measure (Base Word) produced the significant beta value (β = .283) and phonological measure (Sound Deletion) beta score was (β = .218). This suggested that the addition of Hindi Base Word and Hindi Sound Deletion measures increased the level of prediction of English word reading in Grade 3.

Summary

Research question 3 designed to investigate if L1 Hindi morphological and phonological skills influence the L2 English word reading. The regression analyses demonstrated that although Hindi (L1) measures significantly predicted an additional variability in English word reading in Grade 1 and 3, it did not significantly predict additional variability in English word reading in KG and Grade 2. Kindergarten multiple regression analyses suggested that the Hindi phonological and morphological measures were not significantly associated with English word reading. However, the beta value of Hindi morphological measure (Sentence Completion) may suggest some amount of variability in English word reading after controlling English predictor measures. In Grade 1, the analyses demonstrated that the Hindi measures added a small amount of variability in English word reading. The Hindi morphological measure (Word Structure) and Hindi phonological measure (Sound Deletion) both showed significant beta scores, predicted the variability in English word reading. Grade 2 regression analyses suggested that the measures of Hindi were not statistically significant with English word reading. The Hindi phonological and morphological awareness measures produced some amount of beta values which may not predict the variability in English word reading. In contrast, Grade 3 Hindi measures presented the significant association with English word reading. The Hindi phonological measure (Sound Deletion) and Hindi morphological measure (Base Word) produced the significant beta values predicting the variability in English word reading.

5.7. Conclusion

The analyses of this study aimed to answer three research questions. Research question 1 investigated whether there was a relationship between phonological and morphological awareness with the Hindi L1 and English L2 word reading. Research question 2 examined the morphological and phonological awareness as potential predictors of Hindi L1 and English L2 word reading. Correlation results indicated that most of the variables were significantly positively correlated. Hierarchical Multiple Regression analysis indicated that L1 morphological awareness was dependent and independent on vocabulary knowledge, mainly contributed to L1 word reading. In saying that, the results also showed the significant impact of phonological awareness on L2 word reading. In L1 and L2 word reading, however, phonological and morphological knowledge both explained variability to some degree. Research question 3 sought to find out if L1 Hindi morphological and phonological awareness predicts the variability in English L2 word reading. Regression analyses indicated that there is significant influence in from Hindi measures to English word reading (discussed further in Chapter 6).

Tables 5.35 and 5.36 reports the correlation analyses from KG to Grade 3 in Hindi and English word reading. Table 5.35 shows the correlations between Hindi word reading and Hindi phonological awareness and morphological awareness. Table 5.36 shows the correlation between English word reading and English phonological awareness and morphological awareness.

Table 5.35

Pearson Correlation Coefficients for Kindergarten (KG) to Grade 3 of Hindi Reading with Phonological and Morphological Awareness

Hindi measures	Pearson correlation coefficient			
	KG	**Grade 1**	**Grade 2**	**Grade 3**
Hindi Sound Isolation (initial sound)	.339*	.434**	.443**	.434**
Hindi Sound Isolation (final sound)	.770**	.524**	.528**	.535**
Hindi Sound Deletion	.648**	.646**	.645**	.621**
Hindi Sound Blending/Substitution	.308*	.724**	.617**	.642**
Hindi Sentence Completion/Base Word	**.871****	**.783****	**.680****	**.723****
Hindi Word Structure	.778**	.607**	.396**	.534**
Hindi Vocabulary	.724**	.717**	.543**	.517**

Note: * p<.05; ** p<.01

Table 5.35 shows that there was a statistically significant correlation between Hindi reading and all measures (p<.01). However, the correlation of morphological awareness measured (Sentence Completion and Base Word) was the strongest from Kindergarten to Grade 3. Hindi Vocabulary also showed large correlations with Hindi word reading across the year levels. The data from Table 5.35 shows that at all grade levels Hindi was generally more strongly associated with morphological awareness compared with phonological awareness. This difference will be discussed later in the thesis (Chapter 6).

Table 5.36

Pearson Correlation Coefficients for Kindergarten (KG) to Grade 3 English Reading with Phonological and Morphological Awareness

English measures	Pearson correlation coefficient			
	KG	Grade 1	Grade 2	Grade 3
English Sound Isolation (initial sound)	**.567****	.466**	.490**	.537**
English Sound Isolation (final sound)	.540**	.365**	.570**	.507**
English Sound Deletion	.271	.378**	.469**	**.598****
English Sound Blending/Substitution	−.224	**.685****	**.600****	.494**
English Sentence Completion/Base Word	.298*	.584**	.574**	.554**
English Word Structure	.221	.574**	.461**	.462**
PPVT (Peabody Picture Vocabulary Test)	.497**	.658**	.793**	.771**

Table 5.36 shows that that there was a statistically significant correlation between English word reading and all measures ($p<.01$) for Grade 1 to Grade 3. English word reading generally correlated more strongly with phonological awareness measures than with morphological awareness measures.

Tables 5.37 and 5.38 describe the level of variance explained by phonological and morphological awareness measures in Hindi and English word reading at each grade level. In addition, the effects of vocabulary knowledge are also presented.

Table 5.37

Percentage of variance in Hindi reading accounted for by morphological awareness, phonological awareness and vocabulary for KG to Grade 3 levels

Grade level	Percentage of variance accounted for*		
	Morphological awareness	Phonological awareness	Vocabulary
KG	27	—	52
Grade 1	20	11	51
Grade 2	29	12	29
Grade 3	30	17	24

* Percentages rounded to nearest whole number

Table 5.37 shows that generally vocabulary accounted for a greater percentage of variability in Hindi reading scores from KG to Grade 1 (about 50%). More than 20 percent of variance was accounted for by morphological awareness and vocabulary from KG to Grade 3.

Table 5.38

*Percentage of variance in English reading accounted for by morphological awareness,
phonological awareness, and vocabulary for KG to Grade 3 levels*

Grade level	Percentage of variance accounted for*		
	Morphological awareness	Phonological awareness	Vocabulary
KG	—	29	23
Grade 1	7	28	43
Grade 2	—	11	63
Grade 3	2	14	52

* Percentages rounded to nearest whole number

Table 5.38 shows that over 50 percent of the variance in English reading scores was accounted
for by vocabulary at Grades 2 and 3. Generally, across all grade levels, variance in English
reading was accounted by phonological awareness and vocabulary, and very little or none by
morphological awareness.

Tables 5.39 shows the influence of Hindi measures on English word reading for KG through
to Grade 3.

Table 5.39

Influence of L1 Hindi morphological and phonological skills on L2 English word reading from KG to Grade 3

Grade level	Percentage of variance in English reading accounted for by Hindi measures	Hindi measure with largest beta value in English reading	
KG	6	Hindi Sentence Completion (morphological measure)	.233
Grade 1	6**	Hindi Sound Deletion (phonological measure)	.203
Grade 2	5	Hindi Sound Deletion (phonological measure)	.143
Grade 3	9**	Hindi Base Word (morphological measure)	.283
		Hindi Sound Deletion (phonological measure)	.218

* Percentages rounded to nearest whole number; **$p<.01$

Table 5.39 shows the relative influence of Hindi measures on English reading at each grade level, controlling for the English predictor measures. A statistically significant increase in predicting English reading by the Hindi measures was at Grade 1 (6 percent) and Grade 3 (9 percent). Table 5.39 also shows the Hindi measure that had the largest beta score for the KG group (.233) was Sentence Completion (morphological measure); for Grade 2 and 3 it was Hindi Sound Deletion (.203 and .143, respectively), and for Grade 3 it was the Hindi Base Word with a beta score of .283. However, Hindi Sound Deletion also seems important, with a beta score of .218. These results are discussed in the next chapter with supporting evidence.

Chapter 6 Discussion and Conclusion

6.1 Introduction

This chapter explores the findings of the current study and considers the implications of them for teaching Hindi Language 1 (L1) reading and English Language 2 (L2) reading. The chapter begins with an overview of the study, which includes a recap of essential information to set the scene. It then moves on to consider the findings of the study within the context of theories about reading, particularly in Hindi and in English as an additional language. The literature helps to confirm that the findings of this study offer new insights into teaching in Hindi and in English. Finally, the chapter considers the opportunities for further studies on this topic and for research-based practices on teaching and learning these languages.

6.2 Study overview

The present study investigated the extent to which phonological and morphological awareness contributed to the word reading competence of children bilingual in Hindi and English. It focused on five major topics:

1. Morphological awareness and word reading in Hindi L1

2. Phonological awareness and word reading in Hindi L1

3. Morphological awareness and word reading in English L2

4. Phonological awareness and word reading in English L2

5. The role of Hindi L1 morphological and phonological awareness in English L2 word reading.

The study was designed to accomplish the following:

1. Investigate associations between bilingual children's phonological awareness, morphological awareness, and their word reading performance in Hindi L1and English L2;

2. Examine children's morphological awareness and phonological awareness as potential predictors of Hindi L1 and English L2 word reading performance; and

3. Determine if bilingual children's Hindi L1 morphological awareness and phonological awareness predict variability in their English L2 word reading scores.

The findings revealed significant relationship between phonological and morphological awareness measures and Hindi L1 word reading proficiency. These relationships were evident across all four grade levels (i.e., kindergarten to Grade 3) represented by the students who participated in this study. However, in Kindergarten level, once Hindi vocabulary was controlled for, the phonological awareness measure Sound Isolation (initial sound) and the morphological awareness measures Sentence Completion and Word Structure continued to show significant relationship with the kindergarten students' word reading in L1. In contrast, among the Grades 1 to 3 students, most measures remained significant despite controlling for vocabulary knowledge.

Most phonological assessment measures, in English L2, are positively associated with the output of word reading. On the other hand, morphological assessment measures show their relation in grades 1 and 3 after controlling vocabulary. With the youngest group of children, two English phonological awareness measures; Sound Isolation (initial sound) and Sound Isolation (final sound)) and one morphological awareness measure (sentence completion) were significantly and positively related to English L2 word reading proficiency. However, when controlling for vocabulary knowledge, only the two phonological awareness measures remained positively associated with English L2 word reading outcomes.

Analysis of the data for the Grade 1 children initially revealed significant relationship between all assessment measures and English L2 word reading, and most remained significant after

controlling for vocabulary knowledge. In Grade 2, all measures were associated with word reading, but after controlling for English vocabulary knowledge, the only significant associations were those between English word reading and the phonological measures of Sound Isolation (final sound), Sound Deletion, and Sound Substitution. The analysis for the eldest group of children (Grade 3) again showed all measures significantly correlated with word reading. However, after controlling for English vocabulary knowledge, all the measures are significantly associated with English L2, one morphological measure (Word Structure) was no longer significant.

The results suggested that the morphological awareness measures were the better predictors of word reading proficiency for Hindi L1 but not English L2. The results of regression analyses, furthermore, indicated that although morphological awareness best predicted Hindi L1 word reading, both vocabulary knowledge and phonological awareness had predictive power. However, in English L2, the results shows that English word reading ability at all grade levels majorly predicted phonological awareness.

The third objective of this study was to identify any evidence of language transfer from Hindi to English that might support reading performance in English. The findings provided evidence that developing reading-related cognitive skills in Hindi may have a facilitative effect on English word reading development. The empirical evidence showed two associations, the first between Hindi morphological awareness and English word reading, and the second between Hindi phonological awareness and English word reading. Specifically, the regression analyses showed that, after controlling for the English predictor measures and English vocabulary, the addition of Hindi morphological awareness (i.e., the Base Word measure) to the regression model increased the model's ability to predict variance in the Grade 3 children's English word reading.

6.3. Theoretical implications of the findings

The findings stated above highlight the relationship between phonological awareness and morphological awareness with Hindi L1 (alphasyllabic orthography) and English L2 (alphabetic orthography) word reading proficiency. So what might explain this relationship? Several studies indicate that the phonological and morphological characteristics of a language shape its orthography (Frost, 2012; Katz & Frost, 1992; Mattingly, 1985; Seidenberg, 2011). The current study arose out of considerations related to alphasyllabic orthography and non-alphasyllabic orthographies (e.g., alphabetic, Hangul, Greek, French, etc.) steered the study towards - within and across Hindi L1 (alphasyllabic) and English L2 (alphabetic) orthographies. Studies such as those by Nag and Snowling (2012) and Nakamura et al. (2014) provide evidence for within and cross-language influences. These researchers' identification of correlations between phonological (syllable and phoneme) awareness and Kannada (alphasyllabic) decoding and between English (alphabetic) decoding and phonemic awareness supports the current study results. Current study findings arising out of analysis of the study's kindergarten and Grades 1, 2, and 3 data also appear to shed light on the dynamic predictors of alphasyllabary and alphabetic word reading. Here, it seems that the variability in L1 and L2 word reading proficiency may indeed be explained by readers' morphological awareness.

These findings extend previous research on alphasyllabic and alphabetic biliteracy because they show that phonological and morphological awareness are important features of alphasyllabic orthography. In addition, the results indicate that among young Hindi-speaking English language learners, alphabetic reading ability depends on phonological awareness and that the major predictor (morphological awareness) of L1 Hindi language learning competence can positively influence English L2 word reading ability.

6.3.1 Comparison of the roles of morphological awareness and phonological awareness in Hindi L1 word reading proficiency

Taken together, the results of the present study showed that, when vocabulary knowledge was controlled for, the Hindi–English bilingual children tended to perform better on morphological awareness than on phonological awareness tasks.

The relationship between morphological awareness and alphasyllabic reading (Hindi L1) found from analysis of the data from the kindergarten to Grade 3 children who participated in the present study may provide a new and additional perspective on this area of research. The present study has similar findings with Gafoor (2013), who conducted a longitudinal study and examined the relationship of morphological knowledge and reading skills in second to fourth graders' L1 Malayalam (South Indian alphasyllabic language). He assessed that morphological awareness is associated with reading skills. More specifically, Hindi (North Indian, L1) and Malayalam (South Indian, L1) are more morphologically transparent languages. The Hindi and Malayalam languages are both part of the Indic writing system that blends the phoneme level with the syllable level (nature of the akshara orthographies). The Malayalam and the Hindi orthography are reasonably transparent since the aksharas' pronunciation and writing almost reflect on each other (Nesan, Sadeghi, & Everatt, 2019). However, the current study differs as the participants (Kindergarten and Grade 1 children) are younger than Gafoor (2013) participants. Additionally, in the current research, a word reading task was used to test children's reading ability while Gafoor (2013) used reading comprehension in regard to examining his participants' reading. Despite these differences, the children in the current research demonstrate a strong link between Hindi L1 word reading and morphological awareness similar to Gafoor's study results (2013).

Moreover, this study may also be consistent with the viewpoint of Smythe and colleagues (Smythe et al., 2008) who investigated grade 3 children in five different orthographies (Arabic,

Chinese, English, Hungarian and Portuguese). These researchers argue that the characteristics of the orthography used to describe a language need to be taken into account before implementation of evaluation measures for a specific language and as such the measurement of word reading skills and a phonological viewpoint of learning difficulties might not be uniformly applicable across all linguistic frameworks. This is because Hindi is relatively shallow orthography and may require more appreciation of morphemes than phonemes. Another possible reason could be the writing process of the Hindi language which may influence the morphological knowledge in reading skills (Kuo & Anderson, 2006). With Hindi L1 bilingual learners, awareness of linguistic skills is vital because Hindi is their birth language and the language they start out with when they begin school. Morphological analysis is also essential with respect to Hindi because, like other Indo-Aryan family languages, it has a rich system of morphology. Grammatical information drawn from Hindi words, such as gender, number, person and the like, relies on the inflectional or derivational suffixes of the language. Gender, for example, can be masculine or feminine; number can be singular or plural; and verbs in the present, past, or future tense. Also, as B. K. Joshi and Kushwah (2016) point out, knowledge of affixes relies on a grammatical construction that in Hindi is called *sandhi*. Sandhi plays an essential role in defining a new word formed from joining two words. Sometimes with this joining, the last letter of the first word and the first letter of the second word are connected. Formal teaching of sandhi begins in the upper elementary grades. However, children begin informally learning this basic morphological knowledge while learning to speak (and read) Hindi at home and on entering school. This consideration can make understanding the link between morphological awareness and Hindi word decoding essential.

Studies from across a number of languages have found that when other linguistic skills, such as phonological or orthographic awareness, are examined at the same time, morphological awareness continues to be an independent predictor of literacy and reading skills among

children. In fact, a recent longitudinal study conducted by Manolitsis et al. (2017) assessed that morphological knowledge in Kindergarten and above grades was a significant predictor of reading in Greek speaking children (relatively transparent orthography), but none of them predicted word reading after vocabulary control. Present study findings, however, show that morphological awareness predicted word reading ability after vocabulary control in all grade levels (Kindergarten to Grade 3). Additionally, Apel and colleagues (Apel et al., 2012) for example, found that morphological awareness significantly and independently contributed to the English word-level reading competence of Grades 2 and 3 children, whereas phonemic awareness did not. This finding aligns with the L1 results for the kindergarten children in the present study where phonological awareness did not predict reading ability. However, it is important to note that the kindergarteners in this study are younger than the participants in the Apel et al. (2012) study were. It may be that younger children are comparatively more influenced than older children by syllables when acquiring reading ability; there may also be an association between syllables and morphemes (McBride-Chang, Shu, Zhou, Wat, & Wagner, 2003). These above studies are in other languages than Hindi, although, these possibilities point to the need for the research into the connection between morphological awareness and Hindi decoding.

Furthermore, a number of studies have found that morphological awareness develops in accordance with age and grade see, for example, (Carlisle, 1995; Mahony et al., 2000; Singson et al., 2000). In contrast, the current study found that the variation in L1 word reading explained by morphological knowledge was not constant across the selected grades, a finding that is similar to one of the findings from the study conducted by Apel, Brimo, Diehm, and Apel (2013). They reported that the effect size for word reading was large for children at kindergarten level but medium for the upper grade children. Carlisle (1995) and Singson et al. (2000) found that the influence of morphological awareness on reading ability increases as

children progress from one grade to the next. However, Roman and colleagues (Roman, Kirby, Parrila, Wade-Woolley, & Deacon, 2009) found no such pattern, and Deacon and Kirby (2004) reported mixed results. In current study, Kindergarten children's morphological awareness prediction level is higher than Grade 1 children are and almost equal to Grade 2 and Grade 3 children, which is in contrast to the findings of those studies showing continuous increases in prediction level with age and grade. However, eldest group of children (Grade 3) accounted for highest percentage of variability of morphological awareness in Hindi word reading compared to other grades in this study. This lack of consensus across studies points to the need to conduct research designed to examine these developmental outcomes longitudinally. Although, longitudinal studies are resource intensive, they are useful in aiding understanding of the developmental factors contributing to skills development across time.

That said, the prediction level of phonological awareness increased, except kindergarten, for Hindi word reading beyond and above vocabulary knowledge. This finding indicates that phonological awareness increases with age, and it is consistent with findings on the contributors to word reading competency in other alphasyllabaries. For example, with respect to Kannada alphasyllabic reading, older students have greater phoneme awareness than younger ones (Nag, 2011; Nag & Snowling, 2012). These two researchers attribute this pattern to older children's familiarity with Kannada's akshara (orthographic unit) and its internal structure, which consists of phonemic elements.

The current study results align with the findings from a number of researchers (Bhide, Gadgil, Zelinsky, & Perfetti, 2014; R. Mishra & Stainthorp, 2007; Nag, Snowling, Quinlan, & Hulme, 2014; Nag & Snowling, 2012; Nakamura et al., 2014) relating to phonological awareness and alphasyllabic reading. These studies in akshara writing systems have shown that phoneme awareness gradually emerges as compared to syllable awareness, while phoneme awareness remains a significant predictor of reading progress. However, the findings from these studies

that showed phonological awareness to be a strong predictor of children's word reading performance did not align entirely with the results of current study. Nag and Snowling (2012), R. Mishra and Stainthorp (2007) and Nakamura et al. (2014) focused on the word decoding of children from Grade 1 and above in Kannada (South Indian) L1 and Oriya (East Indian) L1, both of which have alphasyllabic orthographies similar to Hindi. These researchers did not use morphological awareness as an independent variable, which could explain why they found phonological awareness to be strongly associated with alphasyllabic orthography. Moreover, even if two spoken languages are similar, there is no guarantee that they will be taught similarly or that learners will learn similarly, factors that could explain the different results arising out of research studies in similar languages (R. K. Mishra, 2019). It seems that a variety of reasons may exist as to why the results of the current study differed from some of the results evident in earlier research on alphasyllabic reading. In spite of these similarities and differences with other studies, it is evident that phonological understanding is important, but often in the acquisition of later reading success in alphasyllabic reading. Therefore, the specific effect of phoneme versus syllable knowledge in Hindi on reading development is still uncertain, and needs further study.

Another finding of this study related to the connection between vocabulary knowledge and morphological consistent with the findings of Anglin and colleagues (Anglin et al., 1993), to recognise the meaningful units in words, such as prefixes, suffixes, and roots, and from there gain knowledge of vocabulary (Carlisle & Nomanbhoy, 1993; Kieffer & Box, 2013; Nagy et al., 2003; Shankweiler et al., 1995). McBride Chang and colleagues (McBride-Chang et al., 2008; McBride–Chang et al., 2005) provide understanding into the connection between morphological awareness and vocabulary knowledge across Mandarin, Cantonese, Korean, and English languages. They found that morphological awareness predicted a specific proportion of the variance in vocabulary knowledge among young children, apart from other language-

related abilities, such as phonological awareness. Since morphology has a relationship with vocabulary, and vocabulary predicts reading capacity. Hence, beyond phonological awareness and morphological awareness, vocabulary knowledge also had an important role in the word reading ability of the children in the present study.

Therefore, further research needed not only to confirm the role of morphological awareness with word reading beyond and above vocabulary knowledge but also to clarify the factors that drive the construct of morphological awareness in alphasyllabic reading.

6.3.2 Comparison of morphological awareness and phonological awareness as contributors to English L2 word reading proficiency

The current study adds another language to the growing list of languages showing that phonological awareness is an important facilitator in English L2 word reading and especially so if the L1 orthography differs from the English orthography. R. Mishra and Stainthorp (2007) and Nakamura et al. (2014) found that bilingual children whose L1 was alphasyllabic had a better mastery of English L2 because of the contribution of phonological awareness to competence in English reading. This finding is consistent with the results pertaining to English L2 word reading ability in the current study. However, the participants in the former research were older than those in the current study are, and the researchers did not measure morphological awareness in their studies.

Although, in the current study, both phonological and morphological measures has a relationship with Grade 1 and Grade 3 children's English L2 word reading, phonological processing made a stronger contribution than morphological awareness to English L2 word reading. Carlisle and Nomanbhoy (1993) likewise found that while phonological and morphological awareness contributed to English word reading among Grade 1 children whose native language was English, phonological awareness made the stronger contribution.

However, English was, of course, the participants' second language in the current study. In their longitudinal study, Deacon and Kirby (2004) found that phonological awareness made significant independent contributions to English single word reading by English-speaking children in Grades 2 to 5. They also found that morphological awareness contributes to a small extent but uniquely beyond the effect of phonological awareness. However, that contribution in the current study was not consistent across the grade levels.

Although English and Hindi lie in the same Indo-European family of languages, phonemes are far more important in English than in all other Indo-European languages. The reason for this difference concerns the "irregular" orthography of English, which is a hybrid of Celtic, Roman, and Germanic words (Deacon, 2012). While many languages have some inconsistencies in spelling, few have the irregularity of spelling that characterises English. Hindi, however, is relatively consistent in comparison. In addition, because Hindi has a somewhat more transparent orthography than English, it may not require a greater appreciation of syllables than of phonemes. In other words, the difference may lie in the level of phonological processing, with English relying more on phonemes, and Hindi more on syllables.

As demonstrated above, another possible reason for these different results between Hindi (where morphological awareness was the major predictor) and English (where phonological awareness was the major predictor) is the writing systems of the two languages. English has a relatively deep orthography whereas Hindi has a relatively shallow one. This difference could explain why the morphological awareness of the Hindi–English bilingual children who participated in the current study rarely contributed to L2 reading. This opinion is consistent with Kuo and Anderson (2006), claim that the role of morphological awareness in reading ability may be impacted by the language's writing process.

Vocabulary knowledge also played an important role in the word reading ability of the children in the present research, in addition to phonological awareness. Metsala (1999) concluded that children's growth of phonological awareness is linked to basic vocabulary development. Metsala also found strong associations between four-year-old children's vocabulary scores and their phonological awareness. Phonological awareness measures typically establish a lexical knowledge base, which can distinguish words from the surrounding stream of speech (Walley, Metsala, & Garlock, 2003). In the present study, the results for the various phonological tasks were perhaps due to a relationship between the children's focus on phonetic detail and lexical items. According to Elbro (1996) and Fowler (1991), the growth in lexical representations is more explicit and organized throughout childhood. Garlock and colleagues (Garlock, Walley, & Metsala, 2001) found significant links between (1) diverse spoken words with lexical properties and the development of vocabulary, and (2) word recognition with variations in phonological knowledge. In turn, both applied in early reading. The research also showed that phonological abilities led to the development of vocabulary. It seems that the ability to differentiate phonemic variations promotes bilingual children's proficiency in English reading. Phonemes, for instance, play a special role in how children learn vocabulary as they improve their reading of words. Bilingual readers can benefit from training and better knowledge acquisition on phonological awareness, vocabulary, and decoding skills.

6.3.3 The role of Hindi L1 phonological and morphological skills in English L2 word reading proficiency

One of the goals of this study was to examine whether Hindi L1 morphological and phonological awareness abilities appear to influence English L2 word reading ability. Interestingly, previously identified L1 phonological awareness in an alphasyllabic reading thought to contribute to L2 alphabetic reading ability was not a significant predictor in this study. In the present study, L1 morphological skill contribute to L2 English word reading

ability (Sohn, 2001; Wang et al., 2009). Possible reasons are that some of the children in the present study were younger than the children were in the comparable research, and the methodologies between the current study and the other studies differed. In addition, the contribution of phonological awareness in reading may be mediated by students' other cognitive-linguistic skills. Other explanatory factors could be the product of differences in the nature of early literacy development in L1 and L2, including the nature of instruction in linguistically different orthographies, and the types of reading materials used.

While the hierarchical regression analyses in the current study showed that Hindi morphological awareness was significantly and positively associated with Grade 3 children's English L2 word reading, Hindi phonological awareness produced some additional variability in that ability. Although the prediction level was not large in both cases, this amount of variance still adds a further dimension to understanding transfer across two different orthographies. The Grade 3 children's Hindi measures made a positive contribution of about eight percent to their English L2 word reading. This result again draws support from the work by Nakamura and colleagues (Nakamura et al., 2014), who found a cross-linguistic relationship between Kannada (alphasyllabic) and English (alphabetic) decoding among the Grades 3 to 5 children who participated in that study. The researchers also noted that the effects across languages were not constant. However, the current study did not mirror the findings from the Nakamura et al. study, in terms of the non-significant contribution of phonological awareness from L1 to L2 reading.

As concluded from the correlational analysis recounted in Chapter 5, morphological awareness shows more explanatory power compared to phonological awareness with respect to Hindi L1 decoding (within-language effect) beyond the effect of vocabulary knowledge. Due to the more predictive power of morphological awareness in L1 word reading proficiency, it may be possible that L1 morphological awareness transfers to L2 word reading (Durgunoğlu, 2013; Durgunoğlu et al., 2002; Geva et al., 1997). Although, Durgunoğlu (2013) study and the current

study differed in some respects (the participating children were fourth graders and their L1 was Spanish), the similar results from them point to the utility of studying cross-language effects across two different languages. Another possible explanation for the morphological awareness finding is that children who understand the process of deriving a new word in their first language may be able to use that knowledge to help them recognise words in their second language. Therefore, Hindi L1 children may be able use their morphological understanding of derivations and inflections in Hindi to aid their English L2 word reading performance (Wang et al., 2009).

Wang and colleagues (Wang et al., 2009) examined the contribution of Korean morphological awareness to English word reading and found a positive association between the two. Bae and Joshi (2018) likewise found a positive transfer from Korean L1 morphological awareness to English L2 reading. These two researchers furthermore found that the linguistic transfer of morphological awareness strengthens as children become older. This theoretical viewpoint is consistent because transfer of language skills was larger for the Grade 3 children, the oldest group of participants in present study. Mention must be made, though, of the different ages of the participating children across the three studies (the two noted above and the current one). The Bae and Joshi (2018) participants were Grades 5 and 6 Korean English L2 learners, those in the Wang and colleagues' (Wang et al., 2009) study were Grades 2, 3, and 4 Korean English L2 learners. However, participants in the present study were kindergartners, first, second, and third graders, are more close to Wang and colleagues' (Wang et al., 2009) participants. Korean is a transparent orthography, which is also a feature of Hindi orthography. Korean morphemes are more productive and hold more syntactic functions than English morphemes, Wang et al. (2009) and Sohn (2001) have demonstrated. Korean does seem to have a complex morphological system: adjectives, for instance, usually require an inflectional suffix in a declarative sentence to convey the present and the past tense (Wang et al., 2009). Hindi suffixes

hold more syntactic functions than English does, similar to the Korean language. Hindi also has a complex morphological features with relatively large number of morphological forms in many verbs and nouns (R. Singh & Agnihotri, 1997). With regard to these interpretations, caution should taken in comparing causal relationship to any of the findings relating to the transfer of phonological and morphological awareness and their influence on the reading of those languages.

In future research, the relationships between phonological awareness and morphological awareness and reading across two distinct orthographies must be identified by both longitudinal and intervention studies.

6.4 Implications for teaching reading

The findings suggest that phonological awareness, morphological awareness, and vocabulary knowledge play roles in enhancing the L1 and L2 word reading of young children. Therefore, educational programmes aimed at developing L1 and L2 reading skills among bilingual children should include appropriate, explicit, and systematic instruction on phonological analysis, morphological analysis, and vocabulary knowledge.

With respect to Hindi L1 learners, the findings indicate the need for teachers to pay increased attention to these children's morphological awareness, an indication that given credence from research showing this awareness becomes an increasingly important factor in children is reading literacy development (Anglin et al., 1993; Pike, 2013). Given that morphological awareness appears to be an important component of successful L1 word reading, then perhaps instruction in meaningful units (morphemes) can be used to support L1 learners' reading development. Teaching morphological skills may also be an important part of interventions and whole-class instruction directed towards improving reading in L1 classrooms.

In essence, teaching morphological awareness may provide L1 learners with a useful reading strategy. Such awareness may also aid these children's understandings of word structure, sentence structure, and functional information, and thereby benefit their L1 reading skills. Apel and colleagues (Apel et al., 2013) investigated kindergarten, Grades 1 and 2, children's understanding of affixes and the links between base words and their inflected and derived forms in an English-language study. The researchers found the effect sizes of the morphological awareness measures were larger than they expected. They concluded that morphological measures have medium to large size effects while other literacy measures have medium effects. Unlike their study, the current study did not use a pre- and post-test intervention design. An intervention study centred on morphological awareness could be helpful in teasing out more understanding of the skills involved in acquiring Hindi L1 and English L2 reading and literacy skills.

An intervention study would be the best way to investigate any causal relationship between word reading and cognitive–linguistic skills. Such a study would compare improvements in reading for a group of students who receive an intervention (such as, instructions/teaching in phonological/morphological skills) (the experimental group) with improvements made by another group of students who do not receive the teaching of these skills (the control group). This would allow us to determine whether phonological and/or /morphological skills leads to any change in word reading.

Intervention-based studies on Hindi language skills may also confirm the utility of the teaching practices advocated here. A number of studies, for example, indicate that an explicit intervention approach focused on providing students with repeated opportunities to actively reflect on and think about the meaning of root word, prefix, and suffix may be effective in language and literacy skill development (P. N. Bowers, Kirby, & Deacon, 2010; Goodwin &

Ahn, 2010; Goodwin, Lipsky, & Ahn, 2012). P. N. Bowers and colleagues (P. N. Bowers et al., 2010) found that students' morphological awareness improved markedly when teachers provided focused, practice-based instruction in affix and root/base words and recognition and application of inflectional and derivational morphology. A similar study based on Hindi morphological rules and analysis could be helpful in identifying better practice with regard to teaching morphological awareness strategies.

In schools of Delhi region, current teaching practice tends to provide some level of morphological knowledge-based exercises, albeit at selected grade levels (see National curriculum and learning outcomes of elementary schools in Hindi, (National Council of Educational Research and Training, 2019). Examples include, as previously noted, instruction on singular and plural and the use of present, past, and future verb tenses in sentences. However, more focused methods for teaching particular morphological knowledge-based exercises seem merited. Such teaching could bring ongoing insight into how to create a better awareness of the role of morphology during reading development. An intervention study to this end focused on morphemes, which include *base* words and *roots*, *prefixes*, and *suffixes*, could see these words combined in different ways to express particular meanings or to fill grammatical roles. Empirical evidence could be gained from teaching morphological knowledge-based lessons to those children who are struggling with Hindi reading. For example, teachers could give children four sessions of morphological knowledge-based exercises and activities each week for two months. If, after two months, the results revealed improved reading among those children, this would help confirm the importance of morphological awareness in Hindi L1 reading.

More explicitly in relation to such a study, specific subject teachers could point-out examples of words that includes roots/bases, prefixes, and suffixes from the reading material. The difficulty level of the tasks would of course have to be appropriate to the children's ages and

grade levels. An example of teaching Hindi morphological lessons orally at Kindergarten level could see the teacher making a list of words ending in a particular suffix and then reading them aloud separately (morpheme and suffix). (In Hindi, suffixes are easier to learn at the initial stage of learning morphological awareness because they are more common than prefixes.)

The teacher might decide, for example, to use these words at the kindergarten level: दूध /doodh/ means milk, सब्जी /sabjee/ means vegetable, मिठाई /mithaee/ means sweet, खिलौना /khilauna/ means toy. He or she would then tell the children that if we add one suffix वाला (vaala) to each of these words, the new forms of these words are दूधवाला /doodhvaala/ milkman, सब्जीवाला /sabjeevaala/ male vegetable seller, मिठाईवाला /mithaeevaala/ male sweet seller, खिलौनेवाला /khilaunevaala/ toy man. The next step for the teacher would be to give the children the same activity but with different words, for example, फल /phal/ means fruit, घर /ghar/ means house, हिम्मत /himmat/ means courage, and so on. As another activity, the teacher could use different suffixes attached to different words to demonstrate how these change the meaning of the base word. For example, when सोम /soma/ is added to वार /vaar/ it becomes सोमवार /somavaar/, which means Monday, the same as मंगलवार /mangalvaar/ means Tuesday, and so on. Because of the many suffixes used in daily routine language, teachers could start teaching them orally at the earliest stages of schooling. Then, in Grade 1 and 2, they could teach prefixes as well as suffixes, and as the children advance into Grade 3 level, they could add base words and word structure to the ongoing prefix and suffix teaching.

Another example for the higher grades could involve taking Hindi course books and using them to provide at least 12 reading-related lessons. The teacher could ask the children that while reading the content in the book, they underline the words which carry the morphological units (prefixes, suffixes, etc). For example, Grade 2, Lesson 9 in the Hindi book, वानर सेना

/VAANAR SENA/ meaning 'The Army of Kids/Monkeys' contains words, for example, प्रधानमंत्री /pradhanmantaree/ means prime minister, स्वतंत्रता /svatantrata/ means freedom, खिलौनों /khilaunon/ means toys, स्वयंसेविका /svayamsevika/ means volunteer, कार्यालय /kaaryaalay/ means office, मिलकर /milkar/ means together, बच्चों /bachchon/ means children. These words carry either suffixes/prefixes or contain two meaningful constituent parts. After the children complete their underlining, the teacher would need to explain the morphological structure of these words. Another instructional strategy would be to have students build word families by providing a main root and then combining prefixes and suffixes with the root to generate 'new' words. Carlisle (2010) and Henry (1988) in English are among several researchers who emphasise the need to teach young readers word knowledge based on root words and morphemic structure. As they also stress, there is plenty of scope for teachers to foster awareness of both. In other words, the teachers or instructors could play a proactive role on how to design effective reading strategies and how to teach these strategies to their bilingual students.

The role of phonological awareness in the English L2 reading ability of the children in the current study was evident across a number of the analyses and the four school levels. This interaction between the features systematised at the oral level may offer key understanding of the processes underlying learning to read in different orthographies. The preschool National English curriculum in Delhi, India states the requirement for children to "Activities for awareness of sound segments (phonemes, rhyming words) e.g., phonic games with beginning and end sounds" (National Council of Educational Research and Training, 2019, p. 29). This statement strongly indicates the teaching of phonological awareness in the English language given an attention and that can be a reason for strong prediction level among Kindergarten children with L2 English word reading. However, current study data shows that children are better in Hindi compared to English at word level reading. Therefore, given more

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focussed/additional attention to phonological activities can make L2 English reading success better. For example, when teaching the English language in the classroom, teachers need to focus on specific phonological knowledge based tasks and activities.

In fact, phonological awareness, measured by the ability of a child to identify, segment, manipulate, and reflect upon the sound structures of a language has been found to strongly influence reading ability in children. For example, the ability to segment a word into its constituent phonemes and the ability to manipulate phonemes (such as producing "dog" without /d/) have been found to influence reading (Nchindila, 2012). In addition, there is sufficient evidence to suggest that a number of difficulties experienced by children with reading difficulties are due to an underlying deficit in phonological skills. Therefore, such phonological awareness tasks would include deletion, identifying, and substitution of sounds/phonemes. An evidence-based intervention study focused on L2 could help confirm the extent to which specific phonologically based exercises are useful in improving English L2 word decoding.

Furthermore, another result of this study is that the vocabulary supports all the explanations of phonological awareness of English L2, which suggests that vocabulary is actually more useful in L2 as children get older. When children grow older, their L2 English word knowledge increases and their vocabulary increases (Llach & Gómez, 2007). For example, they use several vocabulary items related to the semantic knowledge of school and the words commonly used are; school, class, pencil, book, table, chair, notebook, pen, game playground, prayer, assembly, lunch, etc. Thus, as their age and grade progresses, children increase their word vocabulary in L2. After Kindergarten, a certain level of growth in English vocabulary knowledge occurred. As mentioned above, therefore, because of a relationship between the emphasis of the children on phonetic detail and the production of lexical items increases with their age, and since children get older, vocabulary may be more useful (Metsala, 1999). István (2016) indicated that young English foreign language learners would need explicit guidance and modern

techniques for vocabulary teaching. In current studies, however, knowledge of vocabulary tends to be more useful as children get older. Children's motivation can be sustained with modern strategies that are of interest to them to achieve efficient vocabulary teaching/learning, context-related activities, songs, picture games, word games, imaginative storytelling, and role-plays that require frequent repetition of daily classroom activities (Moon, 2000). Further, in order to achieve successful vocabulary learning, exercises could be flexible and a variety of activity styles must implemented in the English language classroom. Teachers should also understand individual differences that what is fascinating for one student cannot inspire the other; vocabulary exercises could therefore be interesting and short. Vocabulary assignments should not surpass the minimum standard of students and are required to be reasonably achievable. According to these observations and suggestions, further insight into reading processes could explored by a future study focusing on the relation between vocabulary knowledge and reading ability among bilingual children.

In conclusion, these proposed practices in Hindi and English should help children not only learn to express themselves more fluently in their home language, but also aid their learning of different orthographies in a bilingual educational setting. Vocabulary, in addition to this, may play a significant role in the reading success.

6.5 Limitations of this research study

The main limitations relate to the assessment tools used in this research study. This matter would need to address in future research on the matters investigated in this study. Till date, quite a few morphological knowledge measures have been developed and validated for children as young as kindergarten and preschool (Apel & Lawrence, 2011; Carlisle & Feldman, 1995; Diamanti et al., 2017; Manolitsis et al., 2017). A major challenge in determining morphological understanding in these young children is that their experience of morphology is often more

indirect than direct (Carlisle, 1995). In other words, young children have some exposure towards language structure and processes, such as morphemic structure (Casalis, Dusautoir, Colé, & Ducrot, 2009), but they cannot actively talk about or manipulate language. The need is to further develop morphological awareness measures that are appropriate for this population is self-evident.

Other than the English vocabulary test (Peabody Picture Vocabulary Test – IV), the tests used in the present study were not standardised in both languages because at the time of the research no such tools were available. This aspect of the study points to the obvious need to develop standardised measures for use within the context of the current research, that is, Hindi L1 students. Although the developed assessment measures were sufficiently reliable for the purpose of this research, further research with standardised assessment tools should provide greater confidence in the conclusions drawn from the findings. Additionally, computer-based measures did not used for this study because computer was not available in schools and children particularly KG group were not used to using computers in the way tester want to use in tests. However, in future study the computer-based measures might give more accuracy in reading competence specifically in older children group.

Next limitation was that only one reading measure (single word reading measure) used in this study. A reading comprehension measure appropriate for the upper grade children could have provided additional information pertaining to the predictive power of phonological and morphological processing in both L1 and L2. Several researchers (Kieffer, Biancarosa, & Mancilla-Martinez, 2013; Kieffer & Lesaux, 2008; Nagy et al., 2003) have argued that measures of reading comprehension are important in explaining variance in the factors contributing to reading ability. The current study did not use Hindi and English reading comprehension measures because the pre-primary students were not capable of performing in the reading comprehension assessment. Further, when sentence reading comprehension

assessed on upper grade children in pilot testing, the pilot part showed that the sentence reading comprehension measure could not be reliably used among the older groups of children. The possible reason for this may be the teaching that these children have received. Perhaps, the oldest group of children might focus more on writing rather than the reading and recitation of the topic, which can affect their reading practice.

Kieffer and colleagues (Kieffer et al., 2013) found a strong relationship between morphological awareness and English reading comprehension (sentence level) across kindergarten to Grade 8 after controlling for phonological and vocabulary measures. If the design of the current study had been of a kind to elicit such findings, it is likely that these would have provided more insight into the roles that Hindi–English phonological awareness, morphological awareness, and vocabulary knowledge play in word reading. This addition might also have provided additional information regarding the transfer of L1 measures to L2 reading.

Another limitation was the differential results when comparing the influence of L1 Hindi to L2 English, where some effects observed in Grades 1 and 3 were not observed in KG and Grade 2. However, in Grades 1 and 2, there was little difference in amount of variance accounted for; one just reached statistical significance while the other just failed to reach statistical significance. They may have had the same effect and the difference between them could have been due to chance. In addition, the effects were greatest in Grade 3 where the children were older. Given that, the reason for this differential result could be external factors like parents' educational background, students' exposure to reading, and societal effects, which may have influenced their morphological and phonological awareness. This needs to be further investigated in a future study.

A further limitation was not finding out about any languages children encountered at home, that is, a child may be in contact with people who speak a dialect of Hindi or another language

than Hindi and English. Verifying the languages or dialect spoken by children in study might be beneficial and increase the accuracy of participant selection procedures. For future research, a questionnaire could be developed for family members about the languages or dialect a child comes into contact with at home. Thus, participants could be selected based on more accurate information about the languages they know.

Moreover, the current study was a cross-sectional study, which looked at whether there was a relationship between reading, phonological awareness and morphological awareness in Hindi and English. This study also looked at the predictors in both L1 and L2. However, this study could not examine the cause or direction of the observed effects. This could be explored in an intervention study.

6.6 Suggestions for future research

Participants in this study included only kindergarten through to Grade 3 Hindi L1 and English L2 bilingual students. Future studies could focus on students bilingual in the same languages from older age groups (e.g., late primary school and secondary school). Analysis of data from older students would likely show more variability within and across languages. For instance, since the prediction of phonological awareness was shown to increase with age and grade in L1 Hindi, vocabulary knowledge also took over most phonological awareness measures in L2 English ascertaining whether this pattern continues in higher grades and to what extent could provide information that is more useful. Along with this, some level of variance was evident in the transference of L1 language skills to L2 reading competence among the Grade 3 children in the current study; it would be useful to know if that influence increases in Grade 4 and beyond.

The current study examined the relationships between morphological and phonological awareness and Hindi and English word reading while controlling for vocabulary knowledge, a

factor that the reading literature has shown to link with phonological and morphological awareness. In addition, other cognitive-linguistic abilities can lead to the relationships between reading, phonology, and morphology. For instance, due to the possible impact of knowledge of sound and morphological structures, orthographic skill can be an important skill (Treiman & Cassar, 1996).

Within the Hindi–English bilingual environment, longitudinal and intervention studies directed towards investigating the developmental reading strategies among the same students, and whether any resultant improvement leads to better reading in L1 and L2, are also beneficial. Researchers who have conducted intervention studies (P. N. Bowers et al., 2010) and longitudinal studies (Kieffer & Lesaux, 2008, 2012; McBride-Chang et al., 2008) of reading acquisition argue that to evaluate the effects of phonological and morphological instruction on vocabulary awareness and word reading, practical evidence is required. Further intervention-based research could therefore also examine the impact of phonological and morphological awareness instruction on Hindi L1 and English L2 word reading performance among kindergarten and primary school children.

In future research, morphological awareness could be tested using a variety of tasks to look at whether morphological elements in Hindi might relate more to syllables than phonemes. Phonological awareness could also be tested at the phoneme and syllable levels individually, using tasks like phoneme deletion and syllable deletion in alphasyllabic and alphabetic languages (Nakamura, Koda, & Joshi, 2014). Furthermore, this research looked at sensible exploratory questions about the impact of L1 Hindi on L2 English and found that older children who were progressing in Hindi would also progress in English. This might lead to further research looking at the influence of learning L2 English on learning L1 Hindi.

6.7 Conclusion

The main purpose of this thesis was to explore the contribution of phonological awareness and morphological awareness to Hindi L1 and English L2 word reading proficiency and the associations of these L1 skills with L2 word reading. The evidence suggests that proficiency in L1 and L2 word reading is predicted by phonological, morphological, and vocabulary knowledge skills. More specifically, among the measures used in the study, morphological awareness was identified as the primary significant predictor of Hindi L1 word reading, while phonological awareness was the primary significant predictor of English L2 word reading. The variability predicted by these skills was independent of that explained by vocabulary knowledge in each of the two languages. The inter-relationships between the three skills areas were thus as important as their independent influences on word reading.

Hindi L1 linguistic-skills also appeared to contribute to English L2 word reading. Such cross-linguistic relationships between morphological/phonological awareness and word reading have implications for both theory and teaching practice within multilingual learning contexts. Although the effects of L1 processes on L2 reading were not large, they provided information that could be useful to researchers wanting to conduct future studies of cross-linguistic influences in Hindi and English.

The findings of this current study are also important for theory development, in terms of both reading models and views of L2 acquisition. The effects of L1 processes on L2 reading may have been influenced by the type of word reading measures used, an aspect of the study that needs to be addressed by future research (e.g., by including standardised measures, computer-based measures and a measure of reading comprehension appropriate for the grade level of the child, perhaps through a longitudinal design). Similarly, future intervention studies needed to

confirm the practical implications of the findings (i.e., ensuring that both phonological and morphological awareness are a focus of teaching in both Hindi L1 and English L2).

REFERENCES

Abu-Rabia, S., Shakkour, W., & Siegel, L. (2013). Cognitive Retroactive Transfer (CRT) of Language Skills Among Bilingual Arabic-English Readers. *Bilingual research journal, 36*(1), 61-81. https://doi.org/10.1080/15235882.2013.775975

Al-Khasawneh, F. M. (2012). Vocabulary learning strategies: A case of Jordan University of Science and Technology. *English for Specific Purposes World, 12*(34), 1-15.

Anderson, R. C. (1978). Schema-directed processes in language comprehension. In *Cognitive psychology and instruction* (pp. 67-82): Springer.

Anderson, R. C. (2019). Role of the Reader's Schema in Comprehension, Learning, and Memory. In D. E. Alvermann, N. J. Unrau, M. Sailors, & R. B. Ruddell (Eds.), (7 ed., pp. 136-145): Routledge.

Anderson, R. C., & Freebody, P. (1981). Vocabulary knowledge. In 1. T. Guthrie (Ed.), Comprehension and teaching: Research reviews (pp. 77-117). Newark. *DE: International Reading Association*.

Anderson, R. C., & Pearson, P. D. (1988). A schema-theoretic view of basic processes in reading comprehension. *Interactive approaches to second language reading*, 37-55.

Anderson, R. C., Valerie, & Roit, M. (1998). Reading as a gateway to language proficiency for language-minority students in the elementary grades. *Promoting learning for culturally and linguistically diverse students: Classroom applications from contemporary research*, 42-54.

Anglin, J. M., Miller, G. A., & Wakefield, P. C. (1993). Vocabulary Development: A Morphological Analysis. *Monographs of the Society for Research in Child Development, 58*(10), 1-186. https://doi.org/10.2307/1166112

Anthony, J. L., & Francis, D. J. (2005). Development of Phonological Awareness. *Current directions in psychological science : a journal of the American Psychological Society, 14*(5), 255-259. https://doi.org/10.1111/j.0963-7214.2005.00376.x

Apel, K., Brimo, D., Diehm, E., & Apel, L. (2013). Morphological awareness intervention with kindergartners and first-and second-grade students from low socioeconomic status homes: A feasibility study.

Apel, K., & Lawrence, J. (2011). Contributions of morphological awareness skills to word-level reading and spelling in first-grade children with and without speech sound disorder. *Journal of speech, language, and hearing research, 54*(5), 1312-1327. https://doi.org/10.1044/1092-4388(2011/10-0115)

Apel, K., Wilson-Fowler, E. B., Brimo, D., & Perrin, N. A. (2012). Metalinguistic contributions to reading and spelling in second and third grade students. *Reading & writing, 25*(6), 1283-1305. https://doi.org/10.1007/s11145-011-9317-8

Archibald, J., Roy, S., Harmel, S., Jesney, K., Dewey, E., Moisik, S., & Lessard, P. (2006). *A review of the literature on second language learning*: ERIC.

Asli-Badarneh, A., & Leikin, M. (2019). Morphological ability among monolingual and bilingual speakers in early childhood: The case of two Semitic languages. *International Journal of Bilingualism, 23*(5), 1087-1105.

Avons, S. E., Wragg, C. A., Cupples, W. L., & Lovegrove, W. J. (1998). Measures of phonological short-term memory and their relationship to vocabulary development. *Applied Psycholinguistics, 19*(4), 583-601.

Bae, H. S., & Joshi, R. M. (2018). A multiple-group comparison on the role of morphological awareness in reading: within- and cross-linguistic evidence from Korean ESL and EFL learners. *Reading & writing, 31*(8), 1821-1841. https://doi.org/10.1007/s11145-017-9795-4

Bear, D. R., & Templeton, S. (1998). Explorations in Developmental Spelling: Foundations for Learning and Teaching Phonics, Spelling, and Vocabulary. *The Reading teacher, 52*(3), 222-242.

Bentin, S., & Leshem, H. (1993). On the Interaction Between Phonological Awareness and Reading Acquisition: It's a Two-Way Street. *Annals of Dyslexia, 43*(1), 125-148. https://doi.org/10.1007/BF02928178

Berko, J. (1958). *The child's learning of English morphology*, Radcliffe College.).

Berninger, V. W., Abbott, R. D., Nagy, W., & Carlisle, J. F. (2010). Growth in phonological, orthographic, and morphological awareness in grades 1 to 6. *Journal of psycholinguistic research, 39*(2), 141-163.

Bhatia, V. K. (1993). *Punjabi: a cognitive-descriptive grammar*. New York: Routledge.

Bhatia, V. K. (2014). *Colloquial Hindi, 2. e (eBook And MP3 Pack): The Complete Course for Beginners*: Routledge.

Bhatt, S. K. (2012). Using self-study material for classroom teaching. *Electronic Journal of Foreign Language Teaching, 9*(1), 347-365.

Bhide, A., Gadgil, S., Zelinsky, C. M., & Perfetti, C. (2014). Does reading in an alphasyllabary affect phonemic awareness? Inherent schwa effects in Marathi-English bilinguals. *Writing Systems Research, 6*(1), 73-93.

Bialystok, E. (2001). Metalinguistic aspects of bilingual processing. *Annual Review of Applied Linguistics, 21*, 169-181.

Bialystok, E. (2009). Claiming evidence from non-evidence: a reply to Morton and Harper. *Developmental Science, 12*(4), 499-501.

Block, C. C. (1993). Strategy instruction in a literature-based reading program. *The Elementary School Journal, 94*(2), 139-151.

Bourgoin, R. (2014). The Predictive Effects of L1 and L2 Early Literacy Indicators on Reading in French Immersion. *Canadian modern language review, 70*(3), 355-380. https://doi.org/10.3138/cmlr.2346

Bowers, P. G., & Wolf, M. (1993). Theoretical links among naming speed, precise timing mechanisms and orthographic skill in dyslexia. *Reading & writing, 5*(1), 69-85. https://doi.org/10.1007/BF01026919

Bowers, P. N., Kirby, J. R., & Deacon, S. H. (2010). The effects of morphological instruction on literacy skills: A systematic review of the literature. *Review of Educational Research, 80*(2), 144-179.

Bright, W. (1999). A matter of typology: Alphasyllabaries and abugidas. *Written Language & Literacy, 2*(1), 45-55.

Brown, R. (1973). Development of the first language in the human species. *American psychologist, 28*(2), 97.

Buly, M. R., & Valencia, S. W. (2002). Below the bar: Profiles of students who fail state reading assessments. *Educational Evaluation and Policy Analysis, 24*(3), 219-239.

Cain, K. (2010). *Reading development and difficulties* (Vol. 8): John Wiley & Sons.

Çapan, S. A., & Pektas, R. (2013). An Empirical Analysis of the Relationship between Foreign Language Reading Anxiety and Reading Strategy Training. *English Language Teaching, 6*(12), 181-188.

Caravolas, M., & Bruck, M. (1993). The Effect of Oral and Written Language Input on Children′s Phonological Awareness: A Cross-Linguistic Study. *Journal of experimental child psychology, 55*(1), 1-30. https://doi.org/10.1006/jecp.1993.1001

Caravolas, M., & Landerl, K. (2010). The influences of syllable structure and reading ability on the development of phoneme awareness: A longitudinal, cross-linguistic study. *Scientific Studies of reading, 14*(5), 464-484.

Caravolas, M., Volín, J., & Hulme, C. (2005). Phoneme awareness is a key component of alphabetic literacy skills in consistent and inconsistent orthographies: Evidence from Czech and English children. *Journal of experimental child psychology, 92*(2), 107-139.

Cárdenas-Hagan, E., Carlson, C. D., & Pollard-Durodola, S. D. (2007). The cross-linguistic transfer of early literacy skills: The role of initial L1 and L2 skills and language of instruction. *Language, Speech, and Hearing Services in Schools, 38*(3), 249-259.

Carlisle, J. F. (1995). Morphological awareness and early reading achievement. In L. Feldman (Ed.), *Morphological aspects of language processing.* (pp. 189-210): Psychology Press.

Carlisle, J. F. (2000). Reflecting on levels of confidence and competence in skills acquisition. *Medical education, 34*(11), 886-887. https://doi.org/10.1046/j.1365-2923.2000.00826.x

Carlisle, J. F. (2003). Morphology matters in learning to read: A Commentory. *Reading psychology, 24*(3-4), 291-322. https://doi.org/10.1080/02702710390227369

Carlisle, J. F. (2010). Effects of instruction in morphological awareness on literacy achievement: An integrative review. *Reading Research Quarterly, 45*(4), 464-487.

Carlisle, J. F., & Feldman, L. (1995). Morphological awareness and early reading achievement. *Morphological aspects of language processing, 189209*.

Carlisle, J. F., & Fleming, J. (2003). Lexical processing of morphologically complex words in the elementary years. *Scientific Studies of reading, 7*(3), 239-253.

Carlisle, J. F., & Nomanbhoy, D. M. (1993). Phonological and morphological awareness in first graders. *Applied Psycholinguistics, 14*, 177-177.

Carrell, P. L., Devine, J., & Eskey, D. E. (1988). *Interactive approaches to second language reading*. Cambridge;New York;: Cambridge University Press.

Casalis, S., Dusautoir, M., Colé, P., & Ducrot, S. (2009). Morphological effects in children word reading: A priming study in fourth graders. *British Journal of Developmental Psychology, 27*(3), 761-766.

Casalis, S., & Louis-Alexandre, M.-F. (2000). Morphological analysis, phonological analysis and learning to read French: a longitudinal study. *Reading & writing, 12*(3), 303-335. https://doi.org/10.1023/A:1008177205648

Cetin, O. S., & Bay, N. (2015). Enhancing the Early Reading Skills: Examining the Print Features of Preschool Children's Book. *International Education Studies, 8*(1), 113-124.

Chandramouli, C., & General, R. (2011). Census of india 2011. *Provisional Population Totals. New Delhi: Government of India*, 409-413.

Chaney, C. (1992). Language development, metalinguistic skills, and print awareness in 3-year-old children. *Applied Psycholinguistics, 13*(4), 512.

Chatterjee, S., Kar, B. R., & Awasthy, S. (2014). Biliteracy and reading acquisition in Hindi and English among normally progressing readers and dyslexics. *Asia Pacific Journal of Research Vol: I Issue XV*.

Chen, X., & Schwartz, M. (2018). Morphological awareness and literacy in second language learners: A cross-language perspective. *Reading and Writing, 31*(8), 1685-1694.

Cho, J.-R., Chiu, M. M., & McBride-Chang, C. (2011). Morphological Awareness, Phonological Awareness, and Literacy Development in Korean and English: A 2-Year

Longitudinal Study. *Scientific Studies of reading, 15*(5), 383-408. https://doi.org/10.1080/10888438.2010.487143

Choi, Y. H. (2015). Roles of L1 and L2 derivational morphological awareness in L2 reading through the mediation of L2 vocabulary knowledge. *Journal of Asia TEFL, 12*(3).

Clark. (1995). *The lexicon in acquisition* (Vol. 65): Cambridge University Press.

Clark, T. L. (2017). *The connection among morphological, phonological, orthographic, and processing skills, and reading*).

Clarke, M. A. (1988). The short circuit hypothesis of ESL reading–or when language competence interferes with reading performance. *Interactive approaches to second language reading, 2*, 183-205.

Clay, M. M. (2001). *Change over time in children's literacy development*: Heinemann Educational Books.

Cohen, J. (1988). Set correlation and contingency tables. *Applied psychological measurement, 12*(4), 425-434.

Comeau, L., Cormier, P., Grandmaison, É., & Lacroix, D. (1999). A longitudinal study of phonological processing skills in children learning to read in a second language. *Journal of educational psychology, 91*(1), 29.

Cook, V. (2018). Introduction: The Changing L1 in the L2 User's Mind. In V. Cook (Ed.), (pp. 1-18). Bristol, Blue Ridge Summit: Multilingual Matters.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of applied psychology, 78*(1), 98.

Crystal, D. (2003). *English as a Global Language*: Ernst Klett Sprachen.

Curinga, R. (2014). The effect of morphological awareness on reading comprehension: A study with adolescent Spanish-English emergent bilinguals.

D'Angiulli, A., Siegel, L. S., & Serra, E. (2001). The development of reading in English and Italian in bilingual children. *Applied Psycholinguistics, 22*(04), 479-507.

Daffern, T. (2017). Linguistic skills involved in learning to spell: An Australian study. *Language and education, 31*(4), 307-329. https://doi.org/10.1080/09500782.2017.1296855

Daly, E. J., Chafouleas, S. M., Persampieri, M., Bonfiglio, C. M., & LaFleur, K. (2004). Teaching phoneme segmenting and blending as critical early literacy skills: An experimental analysis of minimal textual repertoires. *Journal of Behavioral Education, 13*(3), 165-178.

Daniels, P. T., & Bright, W. (1996). *The World's writing systems*. New York: Oxford University Press.

Deacon, S. H. (2012). Sounds, letters and meanings: the independent influences of phonological, morphological and orthographic skills on early word reading accuracy. *Journal of Research in Reading, 35*(4), 456-475. https://doi.org/10.1111/j.1467-9817.2010.01496.x

Deacon, S. H., Kieffer, M. J., & Laroche, A. (2014). The relation between morphological awareness and reading comprehension: Evidence from mediation and longitudinal models. *Scientific Studies of reading, 18*(6), 432-451.

Deacon, S. H., & Kirby, J. R. (2004). Morphological awareness: Just "more phonological"? The roles of morphological and phonological awareness in reading development. *Applied Psycholinguistics, 25*(2), 223-238. https://doi.org/10.1017/S0142716404001110

Del Campo, R., Buchanan, W. R., Abbott, R. D., & Berninger, V. W. (2015). Levels of phonology related to reading and writing in middle childhood. *Reading & writing, 28*(2), 183-198. https://doi.org/10.1007/s11145-014-9520-5

Deng, T., Shi, J., Dunlap, S., Bi, H., & Chen, B. (2016). Morphological knowledge affects processing of L2 derivational morphology: An event-related potential study. *Journal of Neurolinguistics, 37*, 47-57.

Derewianka, B., & Jones, P. (2016). *Teaching language in context*: ERIC.

Diamanti, V., Mouzaki, A., Ralli, A., Antoniou, F., Papaioannou, S., & Protopapas, A. (2017). Preschool phonological and morphological awareness as longitudinal predictors of early reading and spelling development in Greek. *Frontiers in psychology, 8*, 2039.

Droop, M., & Verhoeven, L. (2003). Language proficiency and reading ability in first-and second-language learners. *Reading Research Quarterly, 38*(1), 78-103.

Dulay, H. C., & Burt, M. K. (1974). Natural sequences in child second language acquisition 1. *Language Learning, 24*(1), 37-53.

Duncan, L. G. (2018). Language and Reading: the Role of Morpheme and Phoneme Awareness. *Current developmental disorders reports, 5*(4), 226-234. https://doi.org/10.1007/s40474-018-0153-2

Duncan, L. G., Casalis, S., & Colé, P. (2009). Early metalinguistic awareness of derivational morphology: Observations from a comparison of English and French. *Applied Psycholinguistics, 30*(3), 405.

Duncan, L. G., Castro, S. L., Defior, S., Seymour, P. H. K., Baillie, S., Leybaert, J., . . . Serrano, F. (2013). Phonological development in relation to native language and literacy: Variations on a theme in six alphabetic orthographies. *Cognition, 127*(3), 398-419. https://doi.org/10.1016/j.cognition.2013.02.009

Dunlosky, J., & Metcalfe, J. (2008). *Metacognition*: Sage Publications.

Dunn, L. M., & Dunn, L. M. (2007). *Peabody picture vocabulary test*: American Guidance Service Circle Pines, MN.

Dunn, L. M., Dunn, L. M., Bulheller, S., & Häcker, H. (1965). *Peabody picture vocabulary test*: American Guidance Service Circle Pines, MN.

Durgunoğlu, A. Y. (2013). Acquiring literacy in English and Spanish in the United States. *Literacy development in a multilingual context: Cross-cultural perspectives*, 135.

Durgunoğlu, A. Y., Nagy, W., & Hancin-Bhatt, B. J. (1993). Cross-language transfer of phonological awareness. *Journal of educational psychology, 85*(3), 453.

Durgunoğlu, A. Y., Peynircioğlu, Z., & Mir, M. (2002). 13 The role of formal definitions in reading comprehension of bilingual students. In (Vol. 134, pp. 299-316): Elsevier Science & Technology.

Dyer, S. (2016). In the case of high attaining, phonemically aware, bilingual Year One children, can spelling tests using phonemically irregular words be an effective strategy in order to improve spelling? *The STeP Journal (Student Teacher Perspectives), 3*(1), 31-41.

Ehri, L. C. (1995). Phases of development in learning to read words by sight. *Journal of Research in Reading, 18*(2), 116-125. https://doi.org/10.1111/j.1467-9817.1995.tb00077.x

Ehri, L. C., & McCormick, S. (1998). Phases of Word Learning: Implications for instruction with delayed and disabled readers. *Reading & writing quarterly, 14*(2), 135-163. https://doi.org/10.1080/1057356980140202

Elbro, C. (1996). Early linguistic abilities and reading development: A review and a hypothesis. *Reading and Writing, 8*(6), 453-485.

Ellis, N. C. (2003). Constructions, chunking, and connectionism: The emergence of second language structure. *The handbook of second language acquisition, 14*, 63.

Engen, L., & Høien, T. (2002). Phonological skills and reading comprehension. *Reading & writing, 15*(7), 613-631. https://doi.org/10.1023/A:1020958105218

Everatt, J., Ocampo, D., Veii, K., Nenopoulou, S., Smythe, I., al Mannai, H., & Elbeheri, G. (2010). 11 Dyslexia in biscriptal readers. *Reading and dyslexia in different orthographies*, 221.

Ezell, H. K., & Justice, L. M. (1998). A pilot investigation of parents' questions about print and pictures to preschoolers with language delay. *Child Language Teaching and Therapy, 14*(3), 273-278.

Ezell, H. K., Justice, L. M., & Parsons, D. (2000). Enhancing the emergent literacy skills of pre-schoolers with communication disorders: A pilot investigation. *Child Language Teaching and Therapy, 16*(2), 121-140.

Feldman, L. B., & Andjelković, D. (1992). Morphological analysis in word recognition. *Advances in psychology, 94*, 343-360.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American psychologist, 34*(10), 906.

Fowler, A. E. (1991). How early phonological development might set the stage for phoneme awareness. *Phonological processes in literacy: A tribute to Isabelle Y. Liberman, 106*, 97-117.

Fracasso, L. E., Bangs, K., & Binder, K. S. (2016). The Contributions of Phonological and Morphological Awareness to Literacy Skills in the Adult Basic Education Population. *Journal of learning disabilities, 49*(2), 140-151. https://doi.org/10.1177/0022219414538513

Frith, U. (1985). Beneath the surface of surface dyslexia. *Surface dyslexia: Neuropsychological and cognitive studies of phonological reading*, 301-330.

Frost, R. (2012). Towards a universal model of reading. *The Behavioral and brain sciences, 35*(5), 263.

Gafoor, K. A. (2013). Influence of Phonological Awareness, Morphological Awareness and Non-Verbal Ability on Reading Comprehension in Malayalam. *Online Submission, 1*(3), 128-138.

Gafoor, K. A., & Remia, K. R. (2013). Failing to Succeed the First School: Exploring Phonological Factors and Letter Reading Ability in Grade 1. *Online Submission*.

Garlock, V. M., Walley, A. C., & Metsala, J. L. (2001). Age-of-acquisition, word frequency, and neighborhood density effects on spoken word recognition by children and adults. *Journal of Memory and Language, 45*(3), 468-492.

Gathercole, S. E., Service, E., Hitch, G. J., Adams, A. M., & Martin, A. J. (1999). Phonological short-term memory and vocabulary development: Further evidence on the nature of the relationship. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition, 13*(1), 65-77.

Gathercole, S. E., Willis, C., & Baddeley, A. D. (1991). Nonword repetition, phonological memory, and vocabulary: A reply to Snowling, Chiat, and Hulme. *Applied Psycholinguistics, 12*(3), 375-379.

Gathercole, S. E., Willis, C. S., Emslie, H., & Baddeley, A. D. (1992). Phonological memory and vocabulary development during the early school years: A longitudinal study. *Developmental psychology, 28*(5), 887.

Gautam, S. (2017). Predictors of Punjabi, Hindi and English reading comprehension among multilingual children in the Punjab region of India.

Genlott, A. A., & Grönlund, Å. (2013). Improving literacy skills through learning reading by writing: The iWTR method presented and tested. *Computers and education, 67*, 98-104. https://doi.org/10.1016/j.compedu.2013.03.007

Geva, E., Wade-Woolley, L., & Shany, M. (1997). Development of Reading Efficiency in First and Second Language. *Scientific Studies of reading, 1*(2), 119-144. https://doi.org/10.1207/s1532799xssr0102_2

Gibson, A., Gold, J., & Sgouros, C. (2003). The power of story retelling. *The tutor*, 1-11.

Gilakjani, A., & Sabouri, N. B. (2016). How Can Students Improve Their Reading Comprehension Skill? *Journal of studies in education (Las Vegas, Nev.), 6*(2), 229. https://doi.org/10.5296/jse.v6i2.9201

Gill, H. S., & Gleason, H. A. (1969). *A reference grammar of Punjabi*: Department of Linguistics, Punjabi University Patiala, India.

Gillon, G. T. (2005). Prologue: Phonological Awarenss: Evidence To Influence Assessment and Intervention. Language, Speech & Hearing Services in Schools. . *36*(4), 281 - 284. (American Speech-Language-Hearing Association)

Gillon, G. T. (2007). Phonological Awareness: From Research to Practice. Challenges in Language and Literacy. *Guilford Publications*.

Goh, C., & Foong, K. P. (1997). Chinese ESL students' learning strategies: A look at frequency, proficiency, and gender. *Hong Kong Journal of Applied Linguistics, 2*(1), 39-53.

Goodman, Y. M. (1982). Retellings of literature and the comprehension process. *Theory into Practice, 21*(4), 301-307.

Goodrich, J. M., Lonigan, C. J., & Farver, J. A. M. (2017). Impacts of a literacy-focused preschool curriculum on the early literacy skills of language-minority children. *Early childhood research quarterly, 40*, 13-24. https://doi.org/10.1016/j.ecresq.2017.02.001

Goodwin, A. P., & Ahn, S. (2010). A meta-analysis of morphological interventions: Effects on literacy achievement of children with literacy difficulties. *Annals of Dyslexia, 60*(2), 183-208.

Goodwin, A. P., Lipsky, M., & Ahn, S. (2012). Word detectives: Using units of meaning to support literacy. *The Reading teacher, 65*(7), 461-470.

Gough, P. B., & Tunmer, W. E. (1986). Decoding, Reading, and Reading Disability. *Remedial and special education, 7*(1), 6-10. https://doi.org/10.1177/074193258600700104

Green, L. (2009). Prologue: Morphology and Literacy: Getting Our Heads in the Game. *Language, speech & hearing services in schools, 40*(3), 283.

Gupta, A. (2004). Reading difficulties of Hindi-speaking children with developmental dyslexia. *Reading and Writing, 17*(1), 79-99.

Gupta, A., & Jamal, G. (2007). Reading strategies of bilingual normally progressing and dyslexic readers in Hindi and English. *Applied Psycholinguistics, 28*(1). https://doi.org/10.1017/S0142716407070038

Hancin-Bhatt, B., & Nagy, W. (1994). Lexical transfer and second language morphological development. *Applied Psycholinguistics, 15*(3), 289-310. https://doi.org/10.1017/S0142716400065905

Harmer, J. (2007). *The practice of English language teaching*: Harlow: Pearson Longman.

Harmer, J. (2008). How to teach English. *ELT journal, 62*(3), 313-316.

Harris, M., & Hatano, G. (1999). Introduction: A cross-linguistic perspective on learning to read and write. In M. Harris & G. Hatano (Eds.), *Learning to read and write: A cross-linguistic perspective* (pp. 51-70). Cambridge, United Kingdom: Cambridge University Press.

Harris, T. L. E., & Hodges, R. E. E. (1995). The Literacy Dictionary: The Vocabulary of Reading and Writing

Hasna, C. (2016). *Impact of mothers' education on early vocabulary development of Bangla speaking preschool children*, (Master's thesis, BRAC University). Retrieved from http://hdl.handle.net/10361/7998

Haspelmath, M., & Sims, A. D. (2013). *Understanding morphology*: Routledge.

HindiLanguage.Info. (n.d.). Affixes. Retrieved from https://hindilanguage.info/hindi-grammar/miscellaneous/affixes/

Høien, T., Lundberg, I., Stanovich, K. E., & Bjaalid, I.-K. (1995). Components of phonological awareness. *Reading and Writing, 7*(2), 171-188.

Hoover, W. A. (2002). The importance of phonemic awareness in learning to read. *SEDL Letter, 14*(3), 9-12.

Huang, H.-S., & Hanley, J. R. (1995). Phonological awareness and visual skills in learning to read Chinese and English. *Cognition, 54*(1), 73-98.

Hulme, C., Caravolas, M., Gabriela, & Brigstocke, S. (2005). Phoneme isolation ability is not simply a consequence of letter-sound knowledge. *Cognition, 97*(1), B1-B11.

Hulme, C., Hatcher, P. J., Nation, K., Brown, A., Adams, J., & Stuart, G. (2002). Phoneme awareness is a better predictor of early reading skill than onset-rime awareness. *Journal of experimental child psychology, 82*(1), 2-28.

István, T. (2016). *Assessing young Hungarian EFL learners' vocabulary and learning strategies*, Doktori értekezés. Szeged: University of Szeged).

Jain, D. (1969). The Constitution of India

Jarmulowicz, L., Hay, S. E., Taran, V. L., & Ethington, C. A. (2008). Fitting derivational morphophonology into a developmental model of reading. *Reading & writing, 21*(3), 275-297. https://doi.org/10.1007/s11145-007-9073-y

Jarvis, S., & Odlin, T. (2000). Morphological type, spatial reference, and language transfer. *Studies in second language acquisition*, 535-556.

Jarvis, S., & Pavlenko, A. (2008). *Crosslinguistic Influence in Language and Cognition*. Florence: Taylor and Francis.

Jeon, E. H. (2011). Contribution of Morphological Awareness to Second-Language Reading Comprehension. *The Modern Language Journal, 95*(2), 217-235.

Jeon, E. H., & Yamashita, J. (2014). L2 Reading Comprehension and Its Correlates: A Meta-Analysis. *Language Learning, 64*(1), 160-212.

Johnston, F. R., Invernizzi, M., & Juel, C. (1998). *Book buddies: Guidelines for volunteer tutors of emergent and early readers*. New York Guilford.

Joshi, B. K., & Kushwah, K. K. (2016). Sandhi: the rule based word formation In Hindi. *International Journal of Computer Science and Information Security, 14*(12), 781.

Joshi, R. M., & McBride, C. (2019). Introduction: Handbook of Literacy in Akshara Orthography. In *Handbook of Literacy in Akshara Orthography* (pp. 3-9): Springer.

Justice, L. M., & Ezell, H. K. (2000). Enhancing children's print and word awareness through home-based parent intervention. *American Journal of Speech-Language Pathology, 9*(3), 257-269.

Justice, L. M., & Ezell, H. K. (2001). Word and print awareness in 4-year-old children. *Child Language Teaching and Therapy, 17*(3), 207-225.

Kachru, B. B., Kachru, Y., & Nelson, C. L. (2006). *The handbook of world Englishes* (1. Aufl. ed.). Malden, MA: Blackwell Pub.

Kalia, V., & Reese, E. (2009). Relations between Indian children's home literacy environment and their English oral language and literacy skills. *Scientific Studies of reading, 13*(2), 122-145.

Kandhadai, P., & Sproat, R. (2010). Impact of spatial ordering of graphemes in alphasyllabic scripts on phonemic awareness in Indic languages. *Writing Systems Research, 2*(2), 105-116.

Kang, H., & Hwang, B. (2010). A study on the language, reading, and yin and sound skills of 5-year-old multicultural and ordinary children. *Language Therapy Research, 19*(1), 143-158. https://doi.org/10.15724/jslhd.2010.19.1.010

Katz, L., & Frost, R. (1992). The reading process is different for different orthographies: The orthographic depth hypothesis. In *Advances in psychology* (Vol. 94, pp. 67-84): Elsevier.

Kaur, R., Anand, M., & Subbarao, B. (2017). Phonological processes in Hindi speaking typically developing children across rural and urban areas. *Language in India, 17*(1), 190-214.

Kendeou, P., & O'Brien, E. J. (2018). Reading comprehension theories: A view from the top down.

Khan, A., & Bajre, P. (2018). Reading alphasyllabic hindi: contributions from phonological and orthographic domains. *Psychology of Language and Communication, 22*(1), 492-515.

Kieffer, M. J., Biancarosa, G., & Mancilla-Martinez, J. (2013). Roles of morphological awareness in the reading comprehension of Spanish-speaking language minority learners: Exploring partial mediation by vocabulary and reading fluency. *Applied Psycholinguistics, 34*(4), 697-725.

Kieffer, M. J., & Box, C. D. (2013). Derivational morphological awareness, academic vocabulary, and reading comprehension in linguistically diverse sixth graders. *Learning and Individual Differences, 24*, 168-175.

Kieffer, M. J., & Lesaux, N. K. (2008). The role of derivational morphology in the reading comprehension of Spanish-speaking English language learners. *Reading and Writing, 21*(8), 783-804.

Kieffer, M. J., & Lesaux, N. K. (2012). Direct and indirect roles of morphological awareness in the English reading comprehension of native English, Spanish, Filipino, and Vietnamese speakers. *Language Learning, 62*(4), 1170-1204.

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological review, 95*(2), 163.

Kirby, J. R., Deacon, S. H., Bowers, P. N., Izenberg, L., Wade-Woolley, L., & Parrila, R. (2012). Children's morphological awareness and reading ability. *Reading & writing, 25*(2), 389-410. https://doi.org/10.1007/s11145-010-9276-5

Kirk, C., & Gillon, G. T. (2009). Integrated Morphological Awareness Intervention as a Tool for Improving Literacy. *Language, speech & hearing services in schools, 40*(3), 341-351. https://doi.org/10.1044/0161-1461(2008/08-0009)

Kirk, S. A., McCarthy, J. J., & Kirk, W. D. (1968). Illinois test of psycholinguistic abilities: Revised edition. *Urbana: University of Illinois Press*.

Koda, K. (1998). The role of phonemic awareness in second language reading. *Second Language Research, 14*(2), 194-215.

Koda, K. (2000). Cross-linguistic variations in L2 morphological awareness. *Applied Psycholinguistics, 21*(3), 297-320.

Koda, K. (2007). Reading and Language Learning: Crosslinguistic Constraints on Second Language Reading Development. *Language Learning, 57*(1), 1-44. https://doi.org/10.1111/0023-8333.101997010-i1

Koul, R. (2019). Addressing Diversity in Indian Science Classrooms. In (pp. 129-142). Singapore: Springer Singapore.

Ku, Y.-M., & Anderson, R. C. (2003). Development of morphological awareness in Chinese and English. *Reading and Writing, 16*(5), 399-422.

Kucer, S. (1987). The cognitive base of reading and writing. *The dynamics of language learning*, 27-51.

Küçükoğlu, H. (2013). Improving Reading Skills Through Effective Reading Strategies. *Procedia, social and behavioral sciences, 70*, 709-714. https://doi.org/10.1016/j.sbspro.2013.01.113

Kuo, L.-J., & Anderson, R. C. (2006). Morphological Awareness and Learning to Read: A Cross-Language Perspective. *Educational psychologist, 41*(3), 161-180. https://doi.org/10.1207/s15326985ep4103_3

Kuo, L.-J., & Anderson, R. C. (2012). Effects of early bilingualism on learning phonological regularities in a new language. *Journal of experimental child psychology, 111*(3), 455-467.

Lam, B. P.-W., & Sheng, L. (2016). The development of morphological awareness in young bilinguals: Effects of age and L1 background. *Journal of speech, language, and hearing research, 59*(4), 732-744.

Lee, Y., Moreno, M. A., Park, H., Carello, C., & Turvey, M. T. (2006). Phonological assimilation and visual word recognition. *Journal of psycholinguistic research, 35*(6), 513-530.

Leikin, M., Leikin, M., Schwartz, M., Schwartz, M., Share, D. L., & Share, D. L. (2010). General and specific benefits of bi-literate bilingualism: a Russian–Hebrew study of beginning literacy. *Reading & writing, 23*(3), 269-292. https://doi.org/10.1007/s11145-009-9210-x

Lewis, M. P., Simons, G. F., & Fennig, C. D. (2014). *Ethnologue: Languages of Asia*: SIL international.

Liberman, I. Y., & Liberman, A. M. (1990). Whole language vs. code emphasis: Underlying assumptions and their implications for reading instruction. *Annals of Dyslexia, 40*(1), 51-76.

Lin, C. Y., Cheng, C., & Wang, M. (2018). The contribution of phonological and morphological awareness in Chinese–English bilingual reading acquisition. *Reading & writing, 31*(1), 99-132. https://doi.org/10.1007/s11145-017-9775-8

Lin, D., McBride-Chang, C., Shu, H., Zhang, Y., Li, H., Zhang, J., . . . Levin, I. (2010). Small wins big: Analytic Pinyin skills promote Chinese word reading. *Psychological Science, 21*(8), 1117-1122.

Liu, P. D., & McBride-Chang, C. (2010). What is morphological awareness? Tapping lexical compounding awareness in Chinese third graders. *Journal of educational psychology, 102*(1), 62.

Llach, M. d. P. A., & Gómez, A. B. (2007). Children's characteristics in vocabulary acquisition and use in the written production. *Revista española de lingüística aplicada*(20), 9-26.

Łockiewicz, M., & Jaskulska, M. (2019). NL reading skills mediate the relationship between NL phonological processing skills and a foreign language (FL) reading skills in students with and without dyslexia: a case of a NL (Polish) and FL (English) with different degrees of orthographic consistency. *Annals of Dyslexia, 69*(2), 219-242. https://doi.org/10.1007/s11881-019-00181-x

Lonigan, C. J. (2007). Vocabulary development and the development of phonological awareness skills in preschool children. *Vocabulary acquisition: Implications for reading comprehension*, 15-31.

Lonigan, C. J., Anthony, J. L., Phillips, B. M., Purpura, D. J., Wilson, S. B., & McQueen, J. D. (2009). The nature of preschool phonological processing abilities and their relations to vocabulary, general cognitive abilities, and print knowledge. *Journal of educational psychology, 101*(2), 345.

Lundberg, I. (1994). Reading difficulties can be predicted and prevented: A Scandinavian perspective on phonological awareness and reading.

Mahony, D., Singson, M., & Mann, V. (2000). Reading ability and sensitivity to morphological relations. *Reading and Writing, 12*(3), 191-218.

Malviya, S., Mishra, R., & Tiwary, U. S. (2016). *Structural analysis of Hindi phonetics and a method for extraction of phonetically rich sentences from a very large Hindi text corpus.* Paper presented at the 2016 Conference of The Oriental Chapter of International Committee for Coordination and Standardization of Speech Databases and Assessment Techniques (O-COCOSDA).

Manolitsis, G., Grigorakis, I., & Georgiou, G. K. (2017). The longitudinal contribution of early morphological awareness skills to reading fluency and comprehension in Greek. *Frontiers in psychology, 8*, 1793.

Marinova-Todd, S. H., Siegel, L. S., & Mazabel, S. (2013). The Association Between Morphological Awareness and Literacy in English Language Learners From Different

Language Backgrounds. *Topics in language disorders, 33*(1), 93-107. https://doi.org/10.1097/TLD.0b013e318280f5d5

Marinova-Todd, S. H., Zhao, J., & Bernhardt, M. (2010). Phonological awareness skills in the two languages of Mandarin-English bilingual children. *Clinical linguistics & phonetics, 24*(4-5), 387-400. https://doi.org/10.3109/02699200903532508

Masica, C. P. (1993). *The indo-aryan languages*: Cambridge University Press.

Masilamani, M. B. (2019). *Influence of morphological, orthographic and phonological awareness in writing skills among bilingual Malay-English speakers: a study of adult (pre-university) students in Peninsular Malaysia*, University of Canterbury, Christchurch, New Zealand). Retrieved from http://canterbury.summon.serialssolutions.com

Mattingly, I. G. (1985). Did orthographies evolve? *Remedial and special education, 6*(6), 18-23.

McBride-Chang, C., Bialystok, E., Chong, K. K. Y., & Li, Y. (2004). Levels of phonological awareness in three cultures. *Journal of experimental child psychology, 89*(2), 93-111. https://doi.org/10.1016/j.jecp.2004.05.001

McBride-Chang, C., Shu, H., Zhou, A., Wat, C. P., & Wagner, R. K. (2003). Morphological awareness uniquely predicts young children's Chinese character recognition. *Journal of educational psychology, 95*(4), 743.

McBride-Chang, C., Tardif, T., Cho, J.-R., Shu, H., Fletcher, P., Stokes, S. F., . . . Leung, K. (2008). What's in a word? Morphological awareness and vocabulary knowledge in three languages. *Applied Psycholinguistics, 29*(3), 437-462.

McBride–Chang, C., Wagner, R. K., Muse, A., Chow, B. W.-Y., & Shu, H. (2005). The role of morphological awareness in children's vocabulary acquisition in English. *Applied Psycholinguistics, 26*(03), 415-435.

McCarty, C., & Lallaway, M. (2012). New Salford Reading Test.

McCutchen, D., Green, L., & Abbott, R. D. (2008). Children's morphological knowledge: Links to literacy. *Reading psychology, 29*(4), 289-314.

McDowell, K., Lefever-Davis, S., Kear, D., & Hamm, D. (2006). *Interactions between vocabulary and phonological distinctness: Impact on phonological awareness*. presented at the Annual meeting of the National Reading Conference, Los Angeles, CA.

McDowell, K., Lonigan, C. J., & Goldstein, H. (2007). Relations among socioeconomic status, age, and predictors of phonological awareness.

McKay, S. L., & Wong, S.-L. C. (1996). Multiple discourses, multiple identities: Investment and agency in second-language learning among Chinese adolescent immigrant students. *Harvard educational review, 66*(3), 577-609.

McNeill, B., & Everatt, J. (2013). Meta-linguistic predictors of word-level literacy skills in monolingual and language minority learners. *Speech, language and hearing, 16*(2), 92-98. https://doi.org/10.1179/2050571X13Z.00000000012

Meganathan, R. (2011). Language Policy in Education and the Role of English in India: From Library Language to Language of Empowerment. *Online Submission*.

Melby-Lervåg, M. (2012). The relative predictive contribution and causal role of phoneme awareness, rhyme awareness, and verbal short-term memory in reading skills: A review. *Scandinavian Journal of Educational Research, 56*(1), 101-118.

Melby-Lervåg, M., & Lervåg, A. (2011). Cross-linguistic transfer of oral language, decoding, phonological awareness and reading comprehension: a meta-analysis of the correlational evidence. *Journal of Research in Reading, 34*(1), 114-135.

Metsala, J. L. (1999). Young children's phonological awareness and nonword repetition as a function of vocabulary development. *Journal of educational psychology, 91*(1), 3.

Metsala, J. L., & Walley, A. C. (1998). *Spoken vocabulary growth and the segmental restructuring of lexical representations: Precursors to phonemic awareness and early reading ability. Word recognition in beginning literacy*. Washington Lawrence Erlbaum Associates.

Mirza, A. (2018). Reading across Different Orthographies: Urdu, Arabic, Hindi and English.

Mirza, A., & Gottardo, A. (2019). Learning to Read in Their Heritage Language: Hindi-English Speaking Children Reading Two Different Orthographies. In *Handbook of Literacy in Akshara Orthography* (pp. 329-351): Springer.

Mishra, R., & Stainthorp, R. (2007). The relationship between phonological awareness and word reading accuracy in Oriya and English: A study of Oriya-speaking fifth-graders. *Journal of Research in Reading, 30*(1), 23-37.

Mishra, R. K. (2019). Cross-Modal Processing of Orthography-Phonology Interface in Hindi-English Bilinguals. In R. M. Joshi & C. McBride (Eds.), *Handbook of Literacy in Akshara Orthography* (pp. 353-371). Cham: Springer International Publishing.

Moon, J. (2000). *Children learning english*: Macmillan Heinemann English Language Teaching Oxford.

Morrow, L. M. (1996). Story retelling: A discussion strategy to develop and assess comprehension. *Lively discussions*, 265-285.

Naeimi, M., Soltani, R., & Damavand, A. (2013). Enhancing the Iranian EFL Learners' Reading Comprehension through Implicit Vocabulary Learning Strategy. *International Journal of English and Education, 2*(2).

Nag, S. (2011). The akshara languages: What do they tell us about children's literacy learning. *Language-cognition: State of the art*, 291-310.

Nag, S. (2014). Alphabetism and the science of reading: from the perspective of the akshara languages. *Frontiers in psychology, 5*, 866.

Nag, S., Snowling, M., Quinlan, P., & Hulme, C. (2014). Child and symbol factors in learning to read a visually complex writing system. *Scientific Studies of reading, 18*(5), 309-324.

Nag, S., & Snowling, M. J. (2012). Reading in an alphasyllabary: Implications for a language universal theory of learning to read. *Scientific Studies of reading, 16*(5), 404-423.

Nagy, W., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly*, 304-330.

Nagy, W., Berninger, V. W., & Abbott, R. D. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of educational psychology, 98*(1), 134.

Nagy, W., Berninger, V. W., Abbott, R. D., Vaughan, K., & Vermeulen, K. (2003). Relationship of Morphology and Other Language Skills to Literacy Skills in At-Risk Second-Grade Readers and At-Risk Fourth-Grade Writers. *Journal of educational psychology, 95*(4), 730-742. https://doi.org/10.1037/0022-0663.95.4.730

Nagy, W., Diakidoy, I.-A. N., & Anderson, R. C. (1993). The acquisition of morphology: Learning the contribution of suffixes to the meanings of derivatives. *Journal of Literacy Research, 25*(2), 155-170.

Nair, A. B. (2013). *Cross–language transfer of phonological and morphological awareness among young Malay second language learners*, University of Malaya).

Nakamura, & De Hoop, T. (2014). Facilitating Reading Acquisition in Multilingual Environments in India (FRAME-India). Final Report. *American Institutes for Research*.

Nakamura, Koda, K., & Joshi, R. M. (2014). Biliteracy acquisition in Kannada and English: A developmental study. *Writing Systems Research, 6*(1), 132-147. https://doi.org/10.1080/17586801.2013.855620

Nathan, T., & Kahaner, M. (2012). ENHANCING THE UNDERLING SKILLS FOR LEARNING SO IMPROVING MATHS AND LITERACY IN PRIMARY SCHOOLS.

Nation, K. (2001). *Learning vocabulary in another language*. Cambridge [England]: Cambridge University Press.

Nation, K. (2005). Children's Reading Comprehension Difficulties.

Nation, K., & Snowling, M. J. (2004). Beyond phonological skills: broader language skills contribute to the development of reading. *Journal of Research in Reading, 27*(4), 342-356. https://doi.org/10.1111/j.1467-9817.2004.00238.x

National Council of Educational Research and Training. (2019). The Preschool Curriculum. Retrieved from https://ncert.nic.in/dee/pdf/Combined_Pre_school_curriculumEng.pdf

Nesan, M., Sadeghi, A., & Everatt, J. (2019). Literacy Acquisition in the Malayalam Orthography: Cognitive/Linguistic Influences within a Multilingual Context. In *Handbook of Literacy in Akshara Orthography* (pp. 85-101): Springer.

Nichols, W. D., & Rupley, W. H. (2004). Matching instructional design with vocabulary instruction. *Reading Horizons: A Journal of Literacy and Language Arts, 45*(1), 4.

Nielsen, D. C., Luetke, B., & Stryker, D. S. (2011). The importance of morphemic awareness to reading achievement and the potential of signing morphemes to supporting reading development. *Journal of Deaf Studies and Deaf Education, 16*(3), 275-288.

Nigam, R. C. (1975). *Grammatical sketches of Indian languages with comparative vocabulary and texts*. Delhi, India: Controller of Publications.

O'Leary, P. M., Cockburn, M. K., Powell, D. R., & Diamond, K. E. (2010). Head Start teachers' views of phonological awareness and vocabulary knowledge instruction. *Early Childhood Education Journal, 38*(3), 187-195.

Omaggio, A. C. (1993). Teaching language in context Boston. *Massachusets: Heinle & Heinle Publishers*.

Padakannaya, P., Pandey, A., Saligram, D., & Ranga Rao, S. (2016). Visual-orthographic complexity of Akshara and eye movements in reading: A study in Kannada alphasyllabary. *Writing Systems Research, 8*(1), 32-43.

Pappas, C. C., & Pettegrew, B. S. (1991). Learning to tell: Aspects of developing communicative competence in young children's story retellings. *Curriculum Inquiry, 21*(4), 419-434.

Paradis, J. (2005). Grammatical morphology in children learning English as a second language.

Paris, S. G., Hamilton, E. E., Israel, S., & Duffy, G. (2009). The development of children's reading comprehension. *Handbook of research on reading comprehension, 1*, 32-53.

Parlindungan, P. (2010). Review on reading theories and its implication: The teaching of reading. *Universitax Kristen Indonesia*.

Pasquarella, A., Chen, X., Gottardo, A., & Geva, E. (2015). Cross-language transfer of word reading accuracy and word reading fluency in Spanish-English and Chinese-English bilinguals: Script-universal and script-specific processes. *Journal of educational psychology, 107*(1), 96.

Perfetti, C. A. (1985). *Reading ability*: oxford university Press.

Perfetti, C. A., & Harris, L. N. (2013). Universal reading processes are modulated by language and writing system. *Language Learning and Development, 9*(4), 296-316.

Perfetti, C. A., & Stafura, J. (2014). Word Knowledge in a Theory of Reading Comprehension. *Scientific Studies of reading, 18*(1), 22-37. https://doi.org/10.1080/10888438.2013.827687

Pike, K. (2013). Early dynamic assessment of morphological awareness and early literacy achievement: A feasibility study.

Ramirez, G., Walton, P., & Roberts, W. (2014). Morphological awareness and vocabulary development among kindergarteners with different ability levels. *Journal of learning disabilities, 47*(1), 54-64.

Rao, S. J. (2012). Strength for Today and Bright Hope for Tomorrow Volume 12: 7 July 2012. *12*.

Rastle, K. (2019). The place of morphology in learning to read in English. *Cortex, 116*, 45-54. https://doi.org/10.1016/j.cortex.2018.02.008

Reddy, P. P., & Koda, K. (2013). Orthographic constraints on phonological awareness in biliteracy development. *Writing Systems Research, 5*(1), 110-130.

Richards, T. L., Aylward, E. H., Berninger, V. W., Field, K. M., Grimme, A. C., Richards, A. L., & Nagy, W. (2006). Individual fMRI activation in orthographic mapping and morpheme mapping after orthographic or morphological spelling treatment in child dyslexics. *Journal of Neurolinguistics, 19*(1), 56-86.

Roberts, G., Good, R., & Corcoran, S. (2005). Story retell: A fluency-based indicator of reading comprehension. *School Psychology Quarterly, 20*(3), 304.

Roman, A. A., Kirby, J. R., Parrila, R. K., Wade-Woolley, L., & Deacon, S. H. (2009). Toward a comprehensive view of the skills involved in word reading in Grades 4, 6, and 8. *Journal of experimental child psychology, 102*(1), 96-113.

Roswell, F. G., & Chall, J. S. (1997). *Roswell-Chall auditory blending test*: Educators Pub. Service.

Saiegh-Haddad, E., & Geva, E. (2008). Morphological awareness, phonological awareness, and reading in English–Arabic bilingual children. *Reading & writing, 21*(5), 481-504. https://doi.org/10.1007/s11145-007-9074-x

Samaraweera, S. (2019). Direct or indirect relationship between morphological awareness and reading comprehension: a study of adult Sinhala (L1) and English (L2) students.

Samuels, S. J., & Kamil, M. L. (1988). Models of the reading process. *Interactive approaches to second language reading*, 22-36.

Saville-Troike, M. (2006). *Introducing second language acquisition*. Cambridge, UK;New York;: Cambridge University Press.

Scheinkman, N. (2004). Picturing a Story. *Teaching pre k-8, 34*(6), 58-59.

Schiff, R., & Saiegh-Haddad, E. (2018). Development and Relationships Between Phonological Awareness, Morphological Awareness and Word Reading in Spoken and Standard Arabic. *Frontiers in psychology, 9*, 356-356. https://doi.org/10.3389/fpsyg.2018.00356

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological assessment, 8*(4), 350.

Schmitt, N., Schmitt, D., & Clapham, C. (2001). Developing and exploring the behaviour of two new versions of the Vocabulary Levels Test. *Language testing, 18*(1), 55-88. https://doi.org/10.1177/026553220101800103

Schwartz, M., Schwartz, M., Share, D. L., Share, D. L., Leikin, M., Leikin, M., . . . Kozminsky, E. (2008). On the benefits of bi-literacy: just a head start in reading or specific orthographic insights? *Reading & writing, 21*(9), 905-927. https://doi.org/10.1007/s11145-007-9097-3

Schwartz, M., Taha, H., Assad, H., Khamaisi, F., & Eviatar, Z. (2016). The role of emergent bilingualism in the development of morphological awareness in Arabic and Hebrew. *Journal of speech, language, and hearing research, 59*(4), 797-809.

Seidenberg, M. S. (2011). Reading in different writing systems: One architecture, multiple solutions.

Seymour, J. L. (2005). READING RELIGIOUS EDUCATION. *Religious education, 100*(2), 107-108. https://doi.org/10.1080/00344080590945081

Shank, R. C., & Abelson, R. (1977). Plans, scripts, goals and understanding. *Hillsdale, NJ*.

Shankweiler, D., Crain, S., Katz, L., Fowler, A., Liberman, A., Brady, S., . . . Fletcher, J. (1995). Cognitive profiles of reading-disabled children: Comparison of language skills in phonology, morphology, and syntax. *Psychological Science, 6*(3), 149-156.

Shu, H., Peng, H., & McBride-Chang, C. (2008). Phonological awareness in young Chinese children. *Developmental Science, 11*(1), 171-181.

Shum, K. K.-M., Ho, C. S.-H., Siegel, L. S., & Au, T. K.-F. (2016). First-Language Longitudinal Predictorsof Second-Language Literacyin Young L2 Learners. *Reading Research Quarterly, 51*(3), 323.

Siebert, L. (2003). Pre-service EFL teachers' beliefs about foreign language learning. *The ORTESOL Journal, 21*, 7-39.

Siegler, R. S. (1998). *Emerging minds: The process of change in children's thinking*: Oxford University Press.

Singh, N., & Mishra, R. K. (2013). Second language proficiency modulates conflict-monitoring in an oculomotor Stroop task: evidence from Hindi-English bilinguals. *Frontiers in psychology, 4*, 322.

Singh, R., & Agnihotri, R. K. (1997). *Hindi morphology: a word-based description* (Vol. 9): Motilal Banarsidass Publ.

Singh, S., & Sarma, V. M. (2011). *Verbal inflection in Hindi: A distributed morphology approach.* Paper presented at the Proceedings of the 25th Pacific Asia Conference on Language, Information and Computation.

Singson, M., Mahony, D., & Mann, V. (2000). The relation between reading ability and morphological skills: Evidence from derivational suffixes. *Reading and Writing, 12*(3), 219-252.

Smith, F. (1994). *Understanding reading: a psycholinguistic analysis of reading and learning to read* (5th ed.). Hillsdale, N.J: L. Erlbaum.

Smythe, I., Everatt, J., Al-Menaye, N., He, X., Capellini, S., Gyarmathy, E., & Siegel, L. S. (2008). Predictors of word-level literacy amongst Grade 3 children in five diverse languages. *Dyslexia (Chichester, England), 14*(3), 170-187. https://doi.org/10.1002/dys.369

Snow, C. E., Science, Technology Policy, I., Rand, C., Group, R. R. S., United States. Office of Educational, R., . . . Rand Education, S. M. C. A. (2002). *Reading for understanding: toward an R&D program in reading comprehension*. Santa Monica, CA: RAND.

Sohn, H.-M. (2001). *The korean language*: Cambridge University Press.

Sood, M. N., Joshi, M. N., & Sharma, M. N. (2015). Pre-reading Skills in Hindi Speaking Children between 3 to 6 Years. *Language in India, 15*(8).

Sparks, R. L., Patton, J., Ganschow, L., Humbach, N., & Javorsky, J. (2008). Early first-language reading and spelling skills predict later second-language reading and spelling skills. *Journal of educational psychology, 100*(1), 162.

Stahl, S. A., & Murray, B. A. (1994). Defining phonological awareness and its relationship to early reading. *Journal of educational psychology, 86*(2), 221.

Stanovich, K. E. (1980). Toward an Interactive-Compensatory Model of Individual Differences in the Development of Reading Fluency. *Reading Research Quarterly, 16*(1), 32-71. https://doi.org/10.2307/747348

Suk-Han Ho, C., & Bryant, P. (1997). Phonological Skills Are Important in Learning to Read Chinese. *Developmental psychology, 33*(6), 946-951. https://doi.org/10.1037/0012-1649.33.6.946

Sun-Alperin, M. K., & Wang, M. (2011). Cross-language transfer of phonological and orthographic processing skills from Spanish L1 to English L2. *Reading & writing, 24*(5), 591-614. https://doi.org/10.1007/s11145-009-9221-7

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273-1296.

Tierney, R. J., & Pearson, P. D. (1981). Learning to Learn from Text: A Framework for Improving Classroom Practice. Reading Education Report No. 30.

Tiffin-Richards, M., Hasselhorn, M., Woerner, W., Rothenberger, A., & Banaschewski, T. (2008). Phonological short-term memory and central executive processing in attention-deficit/hyperactivity disorder with/without dyslexia–evidence of cognitive overlap. *Journal of neural transmission, 115*(2), 227-234.

Treiman, R., & Cassar, M. (1996). Effects of morphology on children's spelling of final consonant clusters. *Journal of experimental child psychology, 63*(1), 141-170.

Tunmer, W. E., & Hoover, W. A. (1992). Cognitive and linguistic factors in learning to read. *Reading acquisition, 175*.

Tunmer, W. E., & Hoover, W. A. (2019). The cognitive foundations of learning to read: A framework for preventing and remediating reading difficulties. *Australian Journal of Learning Difficulties, 24*(1), 75-93.

Tyler, A., & Nagy, W. (1989). The acquisition of English derivational morphology. *Journal of Memory and Language, 28*(6), 649-667.

Vagh, S. B. (2012). Validating the ASER testing tools: Comparisons with reading fluency measures and the Read India measures. *Unpublished report. Retrieved July, 30*, 2018.

Vaid, J., & Gupta, A. (2002). Exploring word recognition in a semi-alphabetic script: The case of Devanagari. *Brain and Language, 81*(1-3), 679-690.

Van Den Broek, P., & Kremer, K. E. (2000). The mind in action: What it means to comprehend during reading. In B. M. Taylor, M. F. Graves, & P. W. van den Broek (Eds.), *Reading for meaning: Fostering comprehension in the middle grades* (pp. 1-31): Teachers College Press.

Van Den Broek, P., & Krenaer, K. E. (2000). To Comprehend During Reading. *Reading for meaning: Fostering comprehension in the middle grades*, 1.

Van Kraayenoord, C. E. (2010). The role of metacognition in reading comprehension. *Focal points of the research and development of pedagogically-psychological perspectives*, 277-302.

Van Staden, A. (2016). Reading in a second language: Considering the "simple view of reading" as a foundation to support ESL readers in Lesotho, Southern Africa. *Per linguam : a journal of language learning, 32*(1), 21-40. https://doi.org/10.5785/32-1-661

Van Staden, A., & Purcell, N. (2016). Multi-sensory learning strategies to support spelling development: A case study of second-language learners with auditory processing difficulties. *International Journal on Language, Literature and Culture in Education, 3*(1), 40-61.

Verhoeven, L. (2007). Early bilingualism, language transfer, and phonological awareness. *Applied Psycholinguistics, 28*(3), 425-439. https://doi.org/10.1017/S0142716407070233

Verhoeven, L., & Carlisle, J. F. (2006). Introduction to the special issue: Morphology in word identification and word spelling. *Reading and Writing, 19*(7), 643-650.

Vikram, S. (2013). Morphology: Indian languages and European languages. *International Journal of Scientific and Research Publications, 3*(6), 1-5.

Wade-Woolley, L., & Geva, E. (1999). Processing inflected morphology in second language word recognition: Russian-speakers and English-speakers read Hebrew. *Reading & writing, 11*(4), 321-343. https://doi.org/10.1023/A:1008097300762

Wallach, M. A., & Wallach, L. (1976). Teaching all children to read.

Walley, A. C., Metsala, J. L., & Garlock, V. M. (2003). Spoken vocabulary growth: Its role in the development of phoneme awareness and early reading ability. *Reading and Writing, 16*(1), 5-20.

Wang, M., Ko, I. Y., & Choi, J. (2009). The importance of morphological awareness in Korean–English biliteracy acquisition. *Contemporary Educational Psychology, 34*(2), 132-142. https://doi.org/10.1016/j.cedpsych.2008.12.002

Wang, M., Park, Y., & Lee, K. R. (2006). Korean-English biliteracy acquisition: Cross-language phonological and orthographic transfer. *Journal of educational psychology, 98*(1), 148.

White, T. G., Graves, M. F., & Slater, W. H. (1990). Growth of reading vocabulary in diverse elementary schools: Decoding and word meaning. *Journal of educational psychology, 82*(2), 281.

Whitehurst, G. J., & Lonigan, C. J. (2001). Emergent literacy: Development from prereaders to readers. *Handbook of early literacy research, 1*, 11-29.

Williams, J. P. (1980). Teaching decoding with an emphasis on phoneme analysis and phoneme blending. *Journal of educational psychology, 72*(1), 1.

Wise, J. C., Sevcik, R. A., Morris, R. D., Lovett, M. W., & Wolf, M. (2007). The Relationship Among Receptive and Expressive Vocabulary, Listening Comprehension, Pre-Reading Skills, Word Identification Skills, and Reading Comprehension by Children With Reading Disabilities. *Journal of speech, language, and hearing research, 50*(4), 1093-1109. https://doi.org/10.1044/1092-4388(2007/076)

Wolter, J. A., Wood, A., & D'Zatko, K. W. (2009). The Influence of Morphological Awareness on the Literacy Development of First-Grade Children. *Language, speech & hearing services in schools, 40*(3), 286-298. https://doi.org/10.1044/0161-1461(2009/08-0001)

Yang, M., Cooc, N., & Sheng, L. (2017). An investigation of cross-linguistic transfer between Chinese and English: a meta-analysis. *Asian-Pacific journal of second and foreign language education, 2*(1), 1-21. https://doi.org/10.1186/s40862-017-0036-9

Yesil-Dagli, U. (2011). Predicting ELL students' beginning first grade English oral reading fluency from initial kindergarten vocabulary, letter naming, and phonological awareness skills. *Early childhood research quarterly, 26*(1), 15-29.

Yule, G. (2010). *Study of Language*. Cambridge: Cambridge University Press.

Zadeh, Z. Y., Farnia, F., & Geva, E. (2012). Toward modeling reading comprehension and reading fluency in English language learners. *Reading and Writing, 25*(1), 163-187.

Zhang, D., & Koda, K. (2017). Assessing L2 vocabulary depth with word associates format tests: issues, findings, and suggestions. *Asian-Pacific journal of second and foreign language education, 2*(1), 1-30. https://doi.org/10.1186/s40862-017-0024-0

Ziegler, J. C., & Goswami, U. (2005). Reading Acquisition, Developmental Dyslexia, and Skilled Reading Across Languages: A Psycholinguistic Grain Size Theory. *Psychological bulletin, 131*(1), 3-29. https://doi.org/10.1037/0033-2909.131.1.3

APPENDICES

Appendix A: English Measures

	SET A	SET B
Measures	**KG and Grade 1**	**Grade 2 and 3**
Reading test	• Single Word Reading (I=15)	• Single Word Reading (I=15)
Phonological awareness	• Sound Isolation (initial sounds) (I=10)	• Sound Isolation (initial sounds) (I=10)
	• Sound Isolation (final sounds) (I=10)	• Sound Isolation (final sounds) (I=10)

	• Sound Deletion (I=10)	• Sound Deletion (I=10)
	• Sound Blending (I=10)	• Sound Substitution (I=10)
Morphological awareness	• Sentence Completion (I=12)	• Base Word (I=10)
	• Word Structure (I=10)	• Word Structure (I=10)
Vocabulary Knowledge	• PPVT - IV (I=60)	• PPVT - IV (I=60)

(Test booklet for examiner)

Instructions: The questionnaire is divided among two broad sections; Set A and Set B. Set A comprises tests for KG and grade 1. Set B comprises tests for grade 2 and 3. Each set of test further divided into four sections that are Word Reading, Phonological awareness, Morphological awareness, and Vocabulary Knowledge Test. All the tests and items are same for KG and Grade 1. Again, the tests and items are same for second and third grade. The score will be given as one point for each question answered correctly and zero for incorrect or no answer. In addition, PPVT is having same marking pattern but number of items divided in different sets and each set have 12 items.

Background Questionnaire

Please answer the following question below

1. Could you please tell me your name?

2. How old are you?

3. What is your school's name?

4. How many languages your mother speaks?

5. What is your father doing?

6. How many languages your father speaks?

7. How many languages you know?

Test Booklet for Kindergarten (KG) and Grade 1

TEST 1

Single Word Reading Test

Instruction: Ask child to read each word clearly from top to bottom in the given list.

Words to read
1. RAT
2. CHAIR
3. COW
4. RISK
5. LATE
6. LION
7. BANANA
8. PLATE
9. SHEET
10. HAT
11. OWL
12. ELEPHANT
13. HOT
14. KITE
15. CAR

TEST 2

Sound Isolation Test (initial sounds)

Instruction: Tell the child to say the initial sounds of given words.

Practice Items:

1. Car (/k/)

2. Plate (/p/)

Items	Answers
1. Side	s
2. Fan	f
3. Zebra	z
4. Food	f
5. Class	k
6. Speak	s
7. Please	p
8. Glass	g
9. Photo	f
10. Book	b

TEST 3

Sound Isolation Test (final sounds)

Instructions: Tell the child to say the final sounds of given words.

Practice items:

    1. Dot (/t/)

    2. Catch (/ch/)

Items	Answers
1. Not	t
2. Watch	ch
3. Egg	g
4. Cross	s
5. Sand	d
6. Ink	k
7. Lamb	b
8. Cold	d
9. Fish	sh
10. Baloon	n

TEST 4

Sound Deletion Test (deletion of initial sounds)

Instruction: Tell the child to say the each word without initial sounds of the given word

Practice items:

1.   Fan, don't say /f/ (an)

2.   Cat, don't say /k/ (at)

Items	Answers
1. Farm, don't say /f/	Arm
2. Bin, don't say /b/	In
3. Sat, don't say /s/	At
4. Rice, don't say /r/	Ice
5. Spot, don't say /s/	Pot
6. Flight, don't say /f/	Light
7. Crash, don't say/c/	Rash
8. Fox, don't say /f/	Ox
9. Stone, don't say /s/	Tone
10. Pink, don't say /p/	Ink

TEST 5

Phonemes Blending Test

Instruction: Tell the child to listen the sound of letters then ask child to make a word from blending these sounds.

Practice Items:

/c/ /a/ /t/ = cat
/h/ /e/ /n/ = hen

Items	**Answers**
1. /s/ /i/ /t/	Sit
2. /p/ /o/ /t/	Pot
3. /f/ /a/ /t/	Fat
4. /t/ /e/ /n/	Ten
5. /p/ /i/ /n/ /k/	Pink
6. /fl/ /a/ / /t/	Flat
7. /f/ /i/ /sh/	Fish
8. /b/ /e/ /d/	Bed
9. /m/ /a/ /p/	Map
10. /sh/ /ee/ /p/	Sheep

TEST 6

Sentence Completion Test

Relatives Task: To determine child's ability to complete the sentence with appropriate morpheme.

Practice items:

My Uncle is a------------ (farm/farmer).   Answer – Farmer

Mohan is -------------- in the music hall. (singing/sing).   Answer - Singing

Items

1. My family has two ------------. (car/cars) Answer - Cars

2. The bull was big but the elephant was ---------. (big/bigger) Answer - Bigger

3. Mohan wanted to go for-----------. (swimming/swim) Answer - Swimming

4. The flower is-----------. (beauty/beautiful) Answer – Beautiful

5. The teacher has a lot of -----------. (know/knowledge) Answer - Knowledge

6. My mother is a--------------. (teacher/teach) Answer - Teacher

7. You should finish your lunch------------. (quick/quickly) Answer - Quickly

8. My friend couldn't see because he lost his------. (glass/glasses) Answer - Glasses

9. The person who drive the bus is called--------. (driver/drive) Answer - Driver

10. There are two -----------. (cats/cat). Answer – Cats

11. Aditya is --------- a book. (reading/read). Answer – Reading

12. My brother has three --------- (apples/apple). Answer - Apples

TEST 7

Word Structure Test

Instruction: Tell the child to segregate two words containing two smaller words.

Practice items:

1. Waterfall	Water	Fall
2. Starfish	Star	Fish

Items	**Answers**	
1. Lunchbox	Lunch	Box
2 Blackboard	Black	Board
3 Classroom	Class	Room
4 Homework	Home	Work
5 Beautiful	Beauty	Full
6 Grandfather	Grand	Father
7 Goodbye	Good	bye
8 Friendship	Friend	Ship
9 Football	Foot	Ball
10 Password	Pass	Word

TEST 8

PPVT-4

(Peabody Picture Vocabulary Test)

PPVT, Edition 4, graphical pictures will be asked from the PPVT question booklet. The test will start from age four, for Kindergarten (KG). Set 1 to 5 will be given to Kindergarten children. Set 2 to 6 will be given to grade 1 children. Each set consists of 12 items. Difficulty level of items increases with the set level (for reference see chapter for under section 4.10.1).

(For 2nd and 3rd Grade)

TEST 1

Single Word Reading Test

Instruction: Ask child to read each word clearly from top to bottom in the given list.

Words to Read

1. Doctor
2. Quickly
3. Talk
4. Cherry
5. Speed
6. Knowledge
7. Listen
8. Around
9. Whistle
10. Wisdom
11. Circle
12. Principal
13. Write
14. Please
15. Triangle

TEST 2

Sound Isolation Test (initial sounds)

Instruction: Tell the child to say the initial sounds of given words.

Practice Items:

1. Class (/k/)

2. Cheap (/ch/)

Items	Answers
1. Phone	f
2. Cherry	ch
3. Zero	z
4. Thumb	th
5. Cross	k
6. Sheet	sh
7. Please	p
8. Go	g
9. School	s
10. Floor	f

TEST 3

Sound Isolation Test (final sounds)

Instructions: Tell the child to say the final sounds of given words

Practice items:

1. Dot (t)

2. South (th)

Items	Answers
1. North	th
2. Watch	ch
3. Ladder	r
4. Cross	s
5. Igloo	oo
6. Junk	k
7. Cow	ow
8. Ground	d
9. Fish	sh
10. Clock	k

TEST 4

Sound Deletion Test

Instruction: Tell the child to say the word without initial, middle or final sounds of the given words.

Practice item:

Cloud but don't say /k/ in cloud = loud

Teach but don't say /ch/ in teach = tea

Items	Answers
1. Inch but don't say /ch/ (in)	In
2. Coat but don't say: /k/ (oat)	Oat
3. Sting but don't say: /t/ (sing)	Sing
4. tall but don't say: /t/ (all)	All
5. Seat but don't say /t/ (sea)	Sea
6. Cold but don't say: /k/ (old)	Old
7. Table but don't say: /b/ (tale)	Tale
8. Hold but don't say: /d/ (hole)	Hole
9. Place but don't say: /l/ (pace)	Pace
10. Cheat but don't say: /ch/ (eat)	Eat

TEST 5

Sound Substitution Test

Instruction: Tell the child to take off first or last sound of word and replace it with another sound to make a new word.

Practice Items:

File /f/ replaced by /m/ beginning sound: Mile
Clam /m/ replace by /p/ ending sound: Clap

Items	Answers
1. page /k/ beginning	Cage
2. rode /p/ ending	Rope
3. shop /ch/ beginning	Chop
4. rusk /t/ ending	Rust
5. hero /z/ beginning	Zero
6. clock /th/ ending	Cloth
7. harm /f/ beginning	Farm
8. room /t/ ending	Root
9. pride /b/ beginning	Bride
10. fish /n/ ending	Fin

TEST 6

Base word Test

Instructions: Say the word and tell child to identify base word.

Practice Items:

Greenish: Green

Dependable: Depend

Items	Answers
1. Biggest	Big
2. Funny	Fun
3. Shorter	Short
4. Largest	Large
5. Drinking	Drink
6. Lovable	Love
7. Powerful	Power
8. Pinkish	Pink
9. Beautician	Beauty
10. Believable	Believe

TEST 7

Word Structure Test

Instruction: Tell the child to segregate two words containing two smaller words.

Practice Items:

Underground	Under	Ground
Sunlight	Sun	Light

Items   Answers

Items		Answers
1 Childhood	Child	Hood
2 Sunflower	Sun	Flower
3 Successful	Success	Full
4 Seashore	Sea	Shore
5 Breakfast	Break	Fast
6 Playground	Play	Ground
7 Worksheet	Work	Sheet
8 Partnership	Partner	Ship
9 Dependable	Depend	Able
10 Manageable	Manage	Able

TEST 8

PPVT-IV

(Peabody Picture Vocabulary Test)

PPVT, Edition 4, graphical pictures will be asked from the PPVT question booklet in Grade 2 and 3.   Set 3 to 7 will be given to grade two children. Set 4 to 8 will be given to grade three children. Each set consists of 12 items. Difficulty level of items increases with the set level (for reference see chapter for under section 4.10.1).

Appendix B: Hindi Measures

	SET A	SET B
Measures	**KG and Grade 1**	**Grade 2 and 3**
Reading test	• Single Word Reading (I=15)	• Single Word Reading (I=15)
Phonological awareness	• Sound Isolation (initial sounds) (I=10)	• Sound Isolation (initial sounds) (I=10)
	• Sound Isolation (final sounds) (I=10)	• Sound Isolation (final sounds) (I=10)
	• Sound Deletion (I=10)	• Sound Deletion (I=10)
	• Sound Blending (I=10)	• Sound Substitution (I=10)
Morphological awareness	• Sentence Completion (I=12)	• Base Word (I=10)
	• Word Structure (I=10)	• Word Structure (I=10)
Vocabulary Knowledge	• Hindi Vocabulary Test (I=30)	• Hindi Vocabulary Test (I=30)

(Test booklet for examiner)

Instructions: The questionnaire is divided among two broad sections; Set A and Set B. Set A comprises tests for KG and grade 1. Set B comprises tests for grade 2 and 3. Each set of test further divided into four sections that are Word Reading, Phonological awareness, Morphological awareness, and Vocabulary Knowledge Test. All the tests and items are same for KG and Grade 1. Again, the tests and items are same for second and third grade. The score will be given as one point for each question answered correctly and zero for incorrect or no answer.

पृष्ठभूमि प्रश्नावली (Background questionnaire)

नीचे दिए गए निम्न सवाल का जवाब दें

1. आप कृपया मुझे अपना नाम बता सकते हैं?

2. उम्र क्या है?

3. आपकी माँ क्या करती हैं?

4. कौन सी भाषा आपकी माँ बोलती हैं?

5. आपके पिता क्या करते हैं?

6. कौन सी भाषा आपके पिता बोलते हैं?

7. सबसे अच्छा दोस्त का नाम क्या है?

परीक्षक के लिए टेस्ट पुस्तिका (Test booklet for Examiner)

(KG and Grade 1)

TEST 1

Single Word Reading Test

Words to read

1. कब
2. छत
3. रथ
4. अदरक
5. तबला
6. बकरी
7. गाय
8. मछली
9. बाजा
10. माला
11. काम
12. हिरन
13. कलम
14. असर
15. नगर

TEST 2

Sound Isolation Test (initial sounds)

Practice Items: 1. अक्षर (/अ/)

2.ओझल (/ओ/)

Items	Answers
1. इमली	इ
2. ईख	ई
3. अनार	अ
4. उल्लू	उ
5. ऐनक	ऐ
6. आकाश	आ
7. अंगूर	अं
8. और	औ
9. ओखली	ओ
10. ऊधम	ऊ

TEST 3

Sound Isolation Test (final sounds)

Practice Items: 1. मामा (/आ/)
2. उल्लू (/ऊ/)

Items	Correct
1. कबूतर	र
2. चाचा	आ
3. नदी	ई
5. ज्ञान	न
6. भालू	ऊ
7. प्रथम	म
8. तोता	आ
9. रवि	इ
9. मूली	ई
10. बनाओ	ओ

TEST 4

Sound Deletion Test

Practice words: 1. 'क्या': बिना क् /k/के कहें, नया शब्द बन गया 'या'
2. 'इधर': बिना इ /i/ के कहें, नया शब्द बन गया 'धर'

Items	Answers
1. इमली बिना इ /i/ के कहें	मली
2. स्वर बिना स् /s/ के कहें	वर
3. अनार बिना अ /a/के कहें	नार
4. उधर बिना उ /u/ के कहें	धर
5. ओखल बिना ओ /o / के कहें	खल
6. उदार बिना उ /u/ के कहें	दार
7. अज्ञात बिना अ /a/के कहें	ज्ञात
8. ईमान बिना ई /ee/ के कहें	मान
9. आकार बिना आ /aa/के कहें	कार
10. क्यारी बिना क् /k/के कहें	यारी

TEST 5

Sound Blending Test

Practice items:

    1. ज + ल = जल
    2. क + म + ल = कमल

Items	**Answers**
1. फ + ल =	फल
2. श + ल + ग + म =	शलगम
3. इ + म + ल + ी =	इमली
4. त + र + ब + ू + ज =	तरबूज
5. इ + म + र + त + ी =	इमरती
6. क + ा + ग + ज =	कागज
7. क + ल + म =	कलम
8. ख + ल =	खल
9. ग + र + म =	गरम
10. त + र + फ =	तरफ

TEST 6

Sentence Completion Test

Practice:

1. किसानों/ किसान: यह जमीन कई ------------- के बीच विभाजित की गई है।
   Answer: किसानों
2. सूबा/सूबेदार: मेरे पिताजी---------हैं।
   Answer: सूबेदार

Items

1. कुत्ते/कुत्ता: मेरे भाई के पास दो ----------- हैं।

2. जोड़/जोड़ना: बच्चे संख्या को --------- चाहते हैं ।

3. किताब/किताबें: मोहन बहुत सी -------- लेने के लिए जाना चाहता था।

4. समझ/समझदार: वह बच्चा बहुत -------- है ।

5. शिक्षा/शिक्षक: सिमरन के पिता एक ------------- हैं।

6. चलाना/चालक: एक व्यक्ति जो बस चला रहा है एक---------- है।

7. ज्ञान/ज्ञानी: शिक्षक बहुत --------- है।

8. बिल्ली/बिल्लियों: चार --------- के लिए खाना बनाओ।

9. कला/कलाकार: मेरी माँ एक -------------- हैं।

10. था/है: मेरा दोस्त नहीं चल सकता क्योंकि वह कल गिर गया ------।

11. अच्छा/अच्छी: आपकी माँ बहुत ----------- थी।

12. चाहती/चाहता: आदित्य बड़ा हो कर एक डॉक्टर बनना --------- है।

TEST 7

Morphological Awareness Task

Word structure

Practice words: 1. राजकुमारी = राज + कुमारी

                 2. चित्रकला = चित्र + कला

	Item	**Correct**
1.	दूधवाला =	दूध + वाला
2.	राजकुमार =	राज + कुमार
3.	कलाकार =	कला + कार
4.	चारपाई =	चार + पाई
5.	बैलगाड़ी =	बैल + गाड़ी
6.	रविवार =	रवि + वार
7.	जन्मदिन =	जन्म + दिन
8.	महारानी =	महा + रानी
9.	बुद्धिवान =	बुद्धि + वान
10.	असरदार =	असर + दार

TEST 8

Hindi vocabulary Measure

Material: 30 A4 size papers, with 120 black and white pictures. Four pictures will be represented on each A4 size paper and one paper is one item. For test administration, one set of 30 items will be given to each participant.

Procedure: Examiner will show each card to the student in chronological order. Children will be instructed to match a target word they listen, with the right picture for each card. The student will be instructed to put the finger on the right picture. A score will be one for correct answer and zero for incorrect and no answer (Series of 30 items attached at the end of measures).

(For 2ⁿᵈ and 3ʳᵈ Grade)

TEST 1

Single Word Reading Test

Items

1. खिलौना

2. वातावरण

3. अनुभव

4. प्रतिज्ञा

5. उपकार

6. स्वागत

7. चमत्कार

8. पाठशाला

9. आक्रमण

10. चौराहा

11. हानिकारक

12. अनुभवी

13. अस्पताल

14. सोमवार

15. हथियार

TEST 2

Sound Isolation Test (initial sounds)

Practice words: 1. कौवा (/क/)
2. प्यास (/प/)

Item	Answers
1. उधर	उ
2. औरत	औ
3. शांत	श
4. बंधन	ब
5. कृपया	क
6. चौराहा	च
7. ध्यान	ध
8. एड़ी	ए
9. स्थान	स
10. श्वेत	श

TEST 3

Sound Isolation Test (final sounds)

Practice words: 1. लोहा (/ आ /)
2. गाडी (/ई/)

Item	Answers
1. कूदना	आ
2. वस्तु	उ
3. रास्ता	आ
4. विद्यार्थी	ई
5. व्यक्ति	इ
6. उल्लू	ऊ
7. मंत्री	ई
8. गौ	औ
9. करो	ओ
10. मूर्ति	इ

TEST 4

Sound Deletion Test

Practice words: 1. बाल्टी: बिना ल /l/ के कहें, नया शब्द बन गया बाटी
                 2. काटा: बिना अंतिम ध्वनि आ /aa/ के कहें, नया शब्द बन गया काट

Item	Answers
1. उस्तरा बिना स /s/ के कहें	उतरा
2. सब्जी बिना ब /b/ के कहें	सजी
3. उदास बिना उ /u/ के कहें	दास
4. द्वार बिना द /d/ के कहें	वार
5. घाटा बिना अंतिम ध्वनि आ /aa/ के कहें	घाट
6. ध्यान बिना ध /dh/ के कहें	यान
7. अलगाव बिना अ /a/के कहें	लगाव
8. मजदूरी बिना ई /ee /के कहें	मजदूर
9. कहो बिना ओ /o/ के कहें	कह
10. भव्य बिना व /v/ के कहें	भय

TEST 5

Sound Substitution Test

Practice words: 1. काम (क /k/ की जगह श /sh/) नया शब्द बन गया शाम
2. सारी (स /s/ की जगह है न /n/) नया शब्द बन गया नारी

Items	Answers
1. खीरा (ख /kh/ की जगह ह /h/)	हीरा
2. तंत्र (त /t/ की जगह है म /m/)	मंत्र
3. मूल (म /m/ की जगह है फ /f/)	फूल
4. क्रान्ति (क/k/ की जगह है भ /bh/)	भ्रान्ति
5. मिल (म /m/ की जगह है ख /kh/)	खिल
6. खीर (ख /kh/ की जगह है न /n/)	नीर
7. गौर (ग /g/ की जगह है क /k/)	कौर
8. कृत (क/k/ की जगह है म /m/)	मृत
9. बुद्ध (ब /b/ की जगह है श /sh/)	शुद्ध
10. शांति (श /sh/ की जगह है क /k/)	कांति

TEST 6

Base Word Test

Practice Words: 1 घूमना = घूम
2 बंदरों = बंदर

Item	Answers
1.मछलियों	मछली
2.मजदूरी	मजदूर
3.मिठाइयां	मिठाई
4.फायदेमंद	फायदा
5.असरदार	असर
6.ललचाना	लालच
7.उम्मीदें	उम्मीद
8.जोड़ना	जोड़
9.विद्यालय	विद्या
10. बुद्धिवान	बुद्धि

TEST 7

Word structure Test

Practice items:

    1 राजकुमार = राज + कुमार
    2 कलाकृति = कला + कृति

Item	Answers
1. स्वयंवर =	स्वयं + वर
2. प्रतियोगिता =	प्रति + योगिता
3. प्रधानमंत्री =	प्रधान + मंत्री
4. शयनकक्ष =	शयन + कक्ष
5. आश्चर्यचकित =	आश्चर्य + चकित
6. भोजनशाला =	भोजन + शाला
7. मधुमक्खी =	मधु + मक्खी
8. प्रतिदिन =	प्रति + दिन
9. भाग्यशाली =	भाग्य + शाली
10. हिमालय =	हिम + आलय

Hindi Vocabulary Test
(From KG to Grade 3)

Material: 30 items

Procedure: Examiner will show each card to the student in chronological order. Children will be instructed to match a target word they listen, with the right picture for each card. The student will be instructed to put the finger on the right picture. A score will be one for correct answer and zero for incorrect or no answer. Test items started from next page.

Hindi Vocabulary Task
(From KG to Grade 3)

हिंदी शब्दावली परीक्षण

Material: 30 cards, with 120 black and white pictures. Four pictures will be represented on each card.

Procedure: Examiner will show each card to the student in chronological order. Children will be instructed to match a target word they listen, with the right picture for each card. The student will be instructed to put the finger on the right picture. A score will be 1 for correct answer and 0 for incorrect.

केजी से ग्रेड तीन तक, परीक्षक क्रम में प्रत्येक छात्र को 30 कागज दिखाएगा। छात्र को प्रत्येक कागज के लिए सही तस्वीर के साथ एक लक्षित शब्द से मेल खाने के निर्देश दिए जाएंगे। छात्र को, परीक्षक के द्वारा पूछे गए सही तस्वीर पर उंगली रखने का निर्देश दिया जाएगा। बच्चों को ऐसे 30 कागज दिखाए जाएंगे। एक अंक सही उत्तर के लिए और गलत के लिए या कोई प्रयास नहीं होगा तो जीरो दिया जाएगा।

उदाहरण के लिए - परीक्षक बच्चों को चार फलों के चित्र दिखाता है (आम, अमरुद, सेब, पपीता) और पूछता है इनमे से 'पपीता' कौन सा है? उत्तर में, बच्चे को पपीते पर उंगली रखनी है।

इन चार फलों में से शिमलामिर्च कौन सी है?
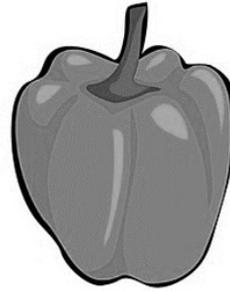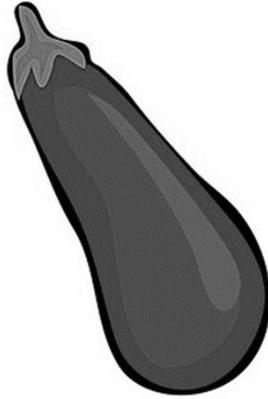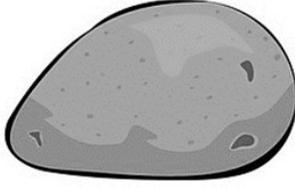
इन चित्रों में से कोहनी दिखाओ

कौन से चित्र में रक्षाबंधन का त्यौहार है?
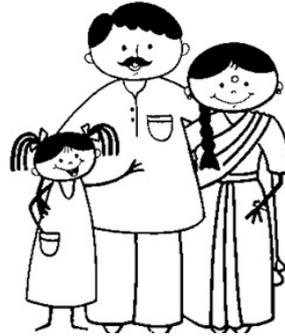
इनमे से गेंहू कौन सा है?
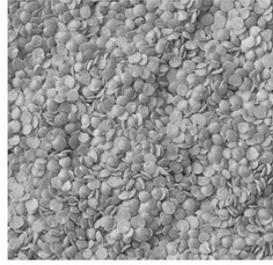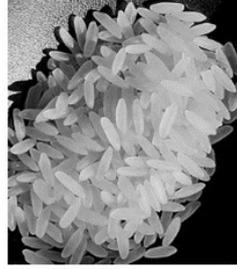
इन चित्रों में से अस्पताल कौन सा है?
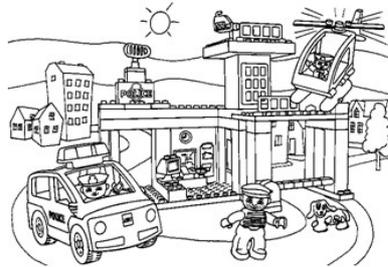
इन में से डाकिया कौन है?

इन में से कुम्हार कौन है?

इन चारों में से लिख कौन रहा है?

इन में से मोर बताइए कौन सा है?

इन चारों में से नागफनी का पौधा कौन सा है?

इन चित्रों में गेंदे का फूल कौन सा है?
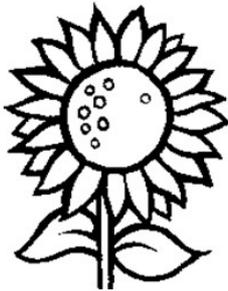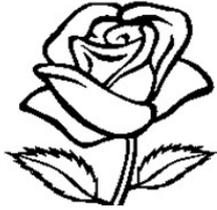
इस कागज पर बकरी कहा है?
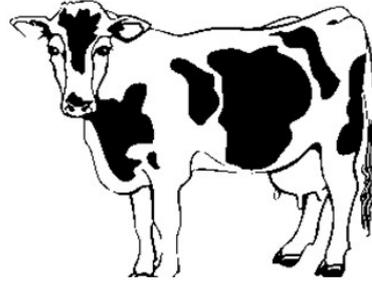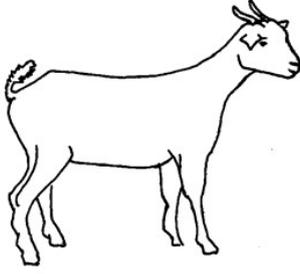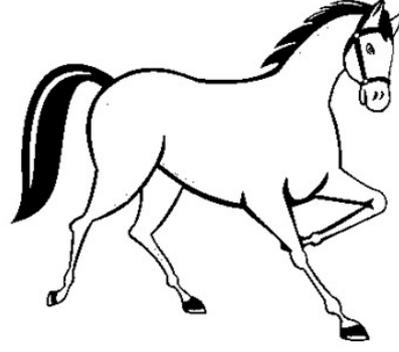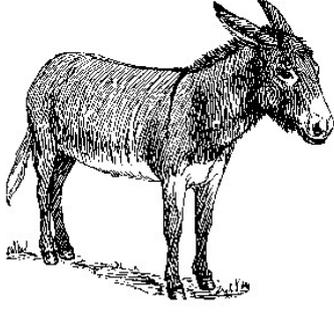
इन में से मगरमच्छ दिखाओ मुझे?
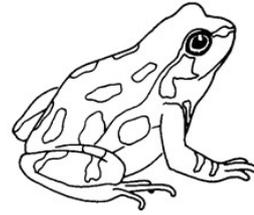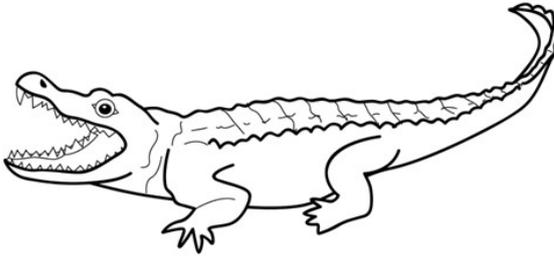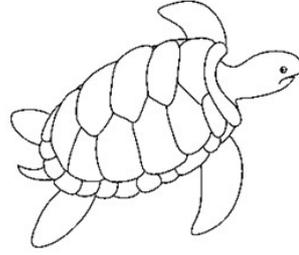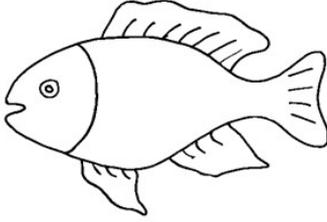
इन में से हॉकी का खेल कौन सा है?
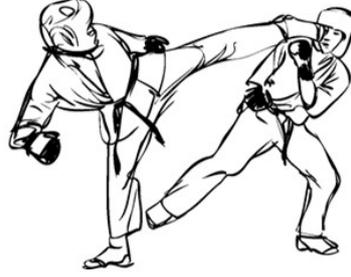
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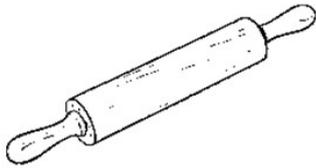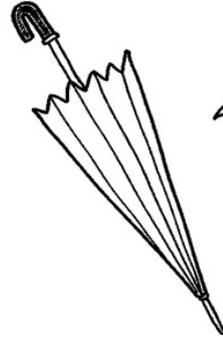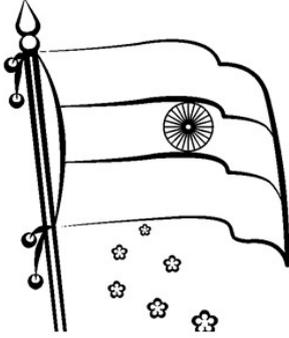
इन में से ईसाई कौन से हैं?

इस कागज पर झरना कहाँ है?
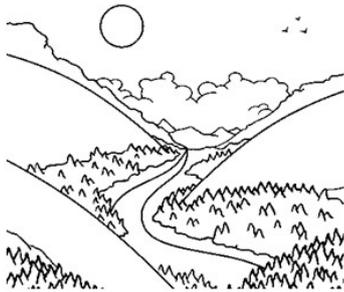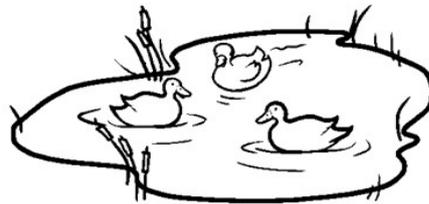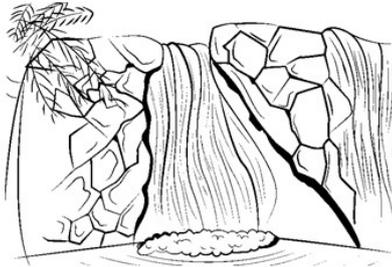
इन में से परेशान आदमी कौन सा है?


त्रिकोण कौन सा हे?
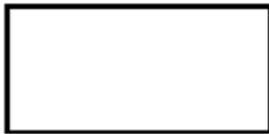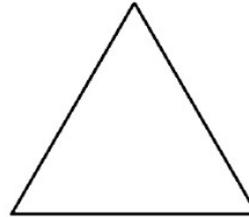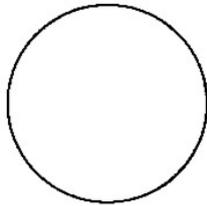
पैदल रिक्शा कहाँ है?

इन में से मस्जिद कौन सी है?


311
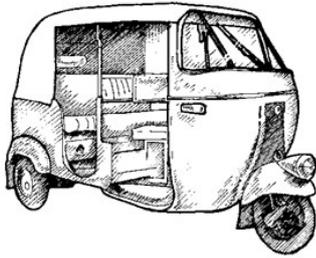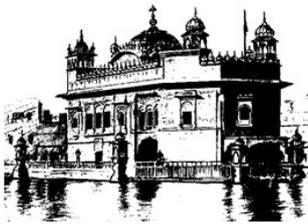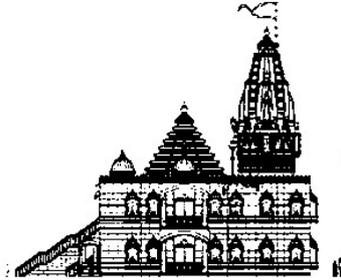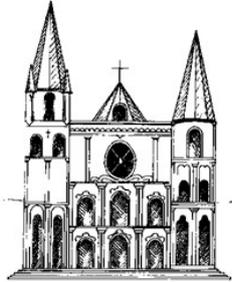
कृपया ढपली दिखाओ मुझे?
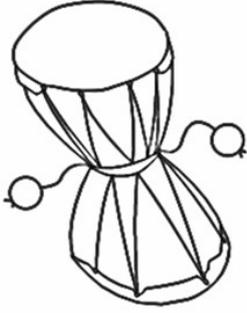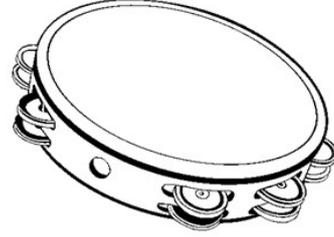
इन चित्रों में बाघ कहाँ है?
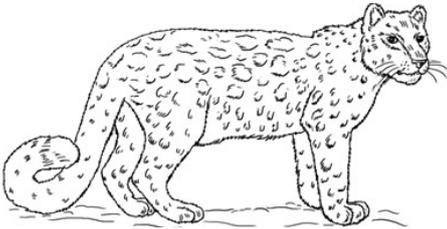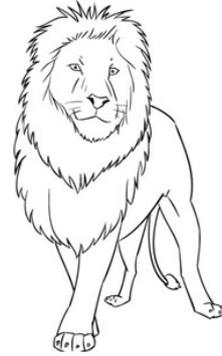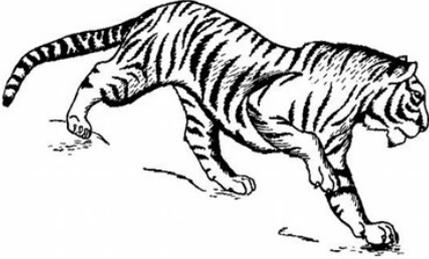
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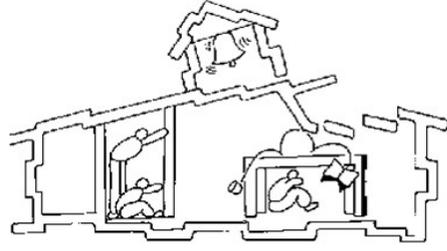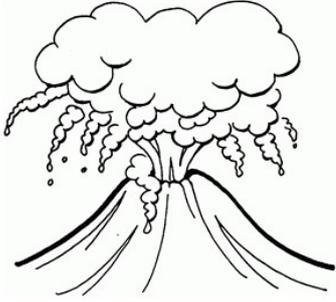

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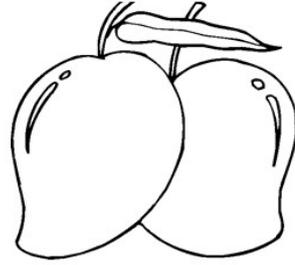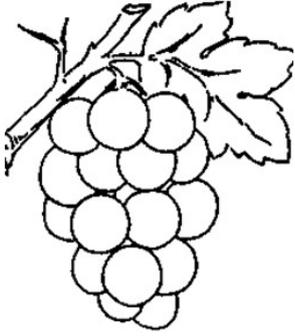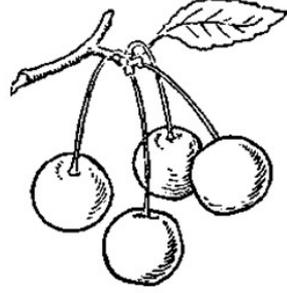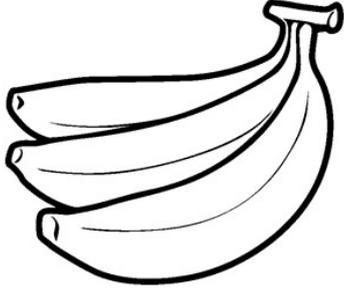
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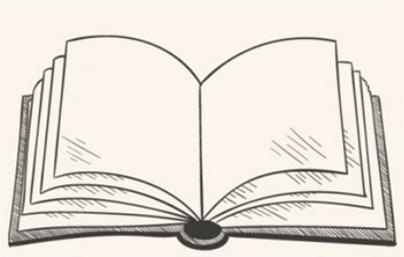
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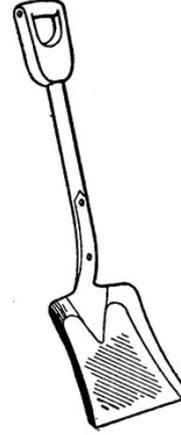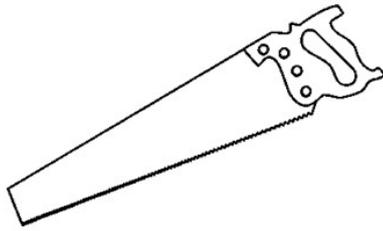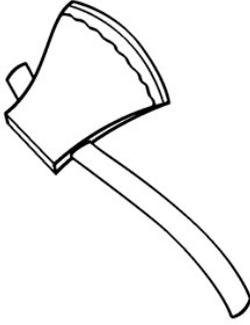
कलाई दिखाओ मुझे कृपया

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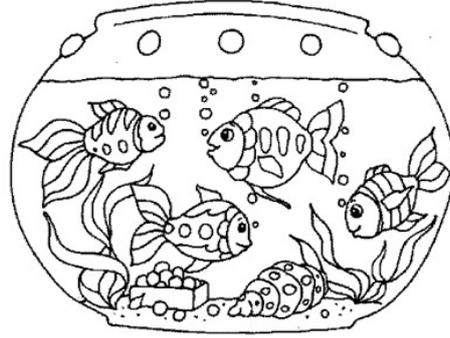
Appendix C: Invitation Letter for Research Participation

College of Education

School of Teacher Education

E-mail: nidhi.sharma@pg.canterbury.ac.nz

Invitation for Research Participation

Dear Principal Sir,

I am Nidhi Bala Sharma a PhD student, from School of Teacher Education, College of Education, University of Canterbury (Christchurch, New Zealand). I am writing to seek permission to use your school as my research site for my study investigating the influence of one language to another on reading skills in young bilinguals (Hindi/English). The overall aim of this PhD research is to the contribution of phonological and morphological awareness to word reading ability in L1 Hindi/L2 English bilingual children: within-language and cross-language influences from L1 to L2

The study has been granted ethical approved by the Human Research Ethics Committee from the University of Canterbury. All data will be used confidentially and a report will be given to your school prior to dissemination of the findings.

I have enclosed an information sheet with further details on the study for your information and instructions should you wish to grant me permission to conduct this study in your school. Please contact me on (local number 91-9557701610) or email me at nidhi.sharma@pg.canterbury.ac.nz should you have any question and concern.

Thank you.

Nidhi Sharma
PhD Candidate

Appendix D: Information Sheet for the Principal of School
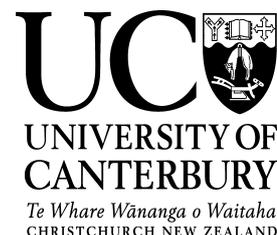
College of Education

School of Teacher Education

Tel: +64 3 3439606, Fax: +64 34347790
E-mail: nidhi.sharma@pg.canterbury.ac.nz

The contribution of phonological and morphological awareness to word reading ability in L1 Hindi/L2 English bilingual children: within-language and cross-language influences from L1 to L2

Information Sheet for the Principal of School

Dear Principal Sir,

 I am Nidhi Bala Sharma a PhD student at the College of Education, University of Canterbury, under the supervision of Professor John Everatt. I have been affiliated to the education sector for the past seven years. My study explores the influence of phonological and morphological awareness on reading skills in Hindi/English young bilingual learners. The current project aims to provide a better understanding of bilingualism and its influence on literacy development in Hindi and English. This project involves two phases for the data collection as this is a longitudinal study.

I would like to invite your school to participate in my present study. If you agree to allow me to conduct the study in your school, the following tasks will be carried out:

An invitation to participate in the study would be sent to all children aged 4 to 8 years old in your school. If the children and their caregivers wish for them to participate in the study, they will need to return a consent form. Some children who participate in the study will be contacted again 10 or 12 months later to continue in a follow up assessment.

    The students with consent to participate will complete 16 measures in Hindi and English which have been developed to tap in to the cross-linguistic transfer between the two languages. The assessments will be conducted in a quiet space at your school. The tasks for KG (Kindergarten) to 3rd grade children will measure their reading knowledge (e.g. reading of simple words), phonological awareness (letter's sound knowledge), simple morphological awareness tasks and Vocabulary knowledge. The tasks will be completed in one individual assessment sessions. Each session will take approximately 50 minutes.

All participation in this research project is voluntary, participation and non-participation will not impact your school and each participant's relationship with the University of Canterbury. I will seek consent from each participant before they will take part in this study.

I will take particular care to ensure the confidentiality of all data gathered for this study. I will also take care to ensure your confidentiality in the publications of the findings. Neither your name nor your school's name will be published in any thesis or report resulting from this study; pseudonyms will be securely stored used to maintain the anonymity of participants. After ten years following this study, all written information related to this study will be destroyed. The results of this study will be publicly available through University of Canterbury library. You may receive a brief report on findings of the study.

The university of Canterbury Educational human ethics committee has reviewed and approved this study. If you have a complaint concerning the manner in which this research project is conducted, please do not hesitate to contact my supervisor (Prof John Everatt) by e-mail at john.everatt@canterbury.ac.nz or the committee on: Educational research human ethics committee University of Canterbury ,Private Bag 4800, Christchurch (NZ); Tel: +64 33642987; Email: humanethics@canterbury.ac.nz. I would be happy to clarify any queries you may have in relation to this research. If you have any queries, contact me through email at nidhi.sharma@pg.canterbury.ac.nz or local number (+91-9557701610) or my supervisor Prof. John Everatt can be contacted by e-mail at john.everatt@canterbury.ac.nz. (Ph: +643 3642987 ext. 4003).

If you would like your school to be involved in this study, please send your endorsed approval to me in the envelope or e-mail me at nidhi.sharma@pg.canterbury.ac.nz.

Thank-you for taking the time to hear about this research.

Sincerely,

Nidhi Bala Sharma

Research Candidate

Appendix E: Information Sheet for Parents

College of Education
School of Teacher Education
Tel: +64 3 3439606, Fax: +64 34347790
E-mail: nidhi.sharma@pg.canterbury.ac.nz

UC
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CANTERBURY
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CHRISTCHURCH NEW ZEALAND

The contribution of phonological and morphological awareness to word reading ability in L1 Hindi/L2 English bilingual children: within-language and cross-language influences from L1 to L2

Information Sheet for Parents

I am a PhD student (Nidhi Bala Sharma) in the College of Education, University of Canterbury, New Zealand. I am doing a research project under the supervision of Professor John Everatt. I am researching the processes involved in children's language learning. For this purpose I would like to invite your child to participate in this research. The Educational Research Human Ethics Committee for the University of Canterbury has approved this project.

If your child participates in the project, they will complete a number of assessment tasks which will be administered by myself and completed within a quiet space at your child's school. The tasks for KG (Kindergarten) to 3rd grade children will measure their reading knowledge (e.g. reading of simple words), phonological awareness (letter's sound knowledge), simple morphological awareness tasks and Vocabulary knowledge. The tasks will be completed in one individual assessment sessions. Each session will take approximately 50 minutes. This assessment protocol will be repeated for participants who are involved with the second phase of the research. The anonymity will be guaranteed in publication of the results. The results of this study will be publicly available through the UC library. After ten years following this study, all written information related to this study will be destroyed. You can receive a brief report on the findings of this research. The results of this research may be used to revise and improve programmes for teaching and learning English as a Second Language. You have the right to withdraw your child from the project at any time without penalty. If you choose to withdraw, I will use my best endeavors to remove any of the information relating to your child from the project. Also, there is no obligation for you and your child to continue phase 2 study. If you are agree to take part your child in this research on voluntary basis, please sign the consent form enclosed. To make this information transparent for you, a separate information sheet in the Hindi language is also attached with this form. If you have any questions about the study you may contact Professor John Everatt at john.everatt@canterbury.ac.nz, Ph: +643 3642987 ext. 4003 or principal of school. If you have a complaint about the study, you may contact at The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch, New Zealand, human-ethics@canterbury.ac.nz; my supervisor (Prof John Everatt) or school principal.Thank-you for taking the time to hear about this research.

Sincerely,

Nidhi Sharma

Appendix F: Parents' Consent Form

<div align="right">

UC
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Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

</div>

College of Education

School of Teacher Education

Tel: +64 3 3439606, Fax: +64 34347790

E-mail: nidhi.sharma@pg.canterbury.ac.nz

The contribution of phonological and morphological awareness to word reading ability in L1 Hindi/L2 English bilingual children: within-language and cross-language influences from L1 to L2

<div align="center">

Parents' Consent Form

</div>

- I have been given a full explanation of this project and have been given an opportunity to ask questions.

- I understand what will be required of my child if I allow my child to take part in this project.

- I understand that my child's participation is voluntary and that he/she may withdraw at any stage without penalty.

- I understand that any information or opinions I and my child provide will be kept confidential to the researcher and that any published or reported results will not identify me and my child.

- I understand that raw data will be securely stored in India under the responsibility of Ms. Nidhi and after ten years following this study, all written information related to this study will be destroyed.

- I understand that my child and I may be approached again to participate in the second phase of the study and there is no obligation for me and my child to continue phase 2 study.

- I understand that that I will receive a report on the findings of this study.

If I have any questions and complaints relating to study, I can contact school's principal or The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch, New Zealand. Email: human-ethics@canterbury.ac.nz, or Prof John Everatt.

By signing below, I agree to allow my child to participate in this research project.

| Name	: _____
Mobile number	: _____
Email address	: _____
Signature	: _____
Date	: _____

Please return this completed consent form to your class teacher in the envelope provided.
Note: Hindi version of this consent form

Appendix G: Information Sheet for Children

College of Education
School of Teacher Education
Telephone: +64 3 3439606
E-mail: nidhi.sharma@pg.canterbury.ac.nz
Telephone: +919557701610 (Nidhi Sharma)

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CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The contribution of phonological and morphological awareness to word reading ability in L1 Hindi/L2 English bilingual children: within-language and cross-language influences from L1 to L2

Information Sheet for Children

(For the parents/caregivers to read to the child)

I am a student at the University of Canterbury (New Zealand).
I will be studying your speaking and reading in Hindi and English.
I am asking you to be part of my study. I would like you to help me read some Hindi and English alphabets with sound and small words with the help of beautiful pictures.

Your parents/caregiver and the school will have to agree that you can take part in this study. Before you start tests, your class-teacher and I will talk to you about what it will be like and how you will do that.

It is your decision if you want to take part in the tests. It is okay if you change your mind and want to stop these tests anytime. Also, in the future study it is your choice to take part in the tests or not. When I am writing about the study I will make sure I do not use your name, that way nobody will know what you said. I won't mention the name of your school either. I will give your school a small report about my study.

If you have any questions about my study you can ask me when I come into your class or you can ask your parents/caregiver or class-teacher to ask me.

If you are unhappy about how I am doing my work you should complain to your class-teacher or parents/caregiver and tell them why you are upset. They will talk to the principal of your school or the University of Canterbury to get things sorted out. Contact details of University of Canterbury is given to your parents/caregivers/principal of your school.
Thank-you for taking the time to hear about this research.

Nidhi Sharma
PhD Candidate

Appendix H: Assent for Children

College of Education
School of Teacher Education
Tel: +64 3 3439606, Fax: +64 34347790
E-mail: nidhi.sharma@pg.canterbury.ac.nz

Assent for Children

- I know what the study is about and my class-teacher and Nidhi have asked me some questions.

- I am happy to help with Nidhi's study by answering questions about my speaking and reading.

- I know that if I change my mind about helping Nidhi she will not mind. Also, It is my choice if I want to continue in phase 2 study or not.

- I know that if I talk to Nidhi she will not use my name or the name of my school when she writes her story about speaking and reading of alphabets and words.

- I know that my school will get some information about this study.

- I know that if I have any questions during the study I can ask my class-teacher or Nidhi.

- If you are unhappy about how Nidhi is organizing this study, you should complain to your class-teacher/parents or caregivers and explain why you are upset. They will talk to the principal of your school or university of Canterbury to get things sorted out.

- It is my choice to continue in Stage 2 study.

- My parents are happy for me to take part in this study and answer some questions about this.

Child's name: _____

Parents/caregiver's name and signature:

_____
____

Date: _____

Contact address: _____

_____

Appendix I: English measures' instruction booklet for testers

All English Tests

These instructions should be well understood before the tests are used. On front page of Hindi and English question booklets, there is a table of all constructs used in this study to measure children's reading ability, morphological knowledge, phonological awareness and vocabulary knowledge.

Each participant should be tested individually. Make sure that participants should have understood the instructions for completing the measures– that the environment (lighting/noise) is appropriate for completing tests, and that the participants have enough space to sit and answer without disturbance from those around them. Examiner needs to give two examples to the child before start each task. The examples are written on question booklet before start the main items. Examiner needs to listen carefully, the answers given by the participants.

Make sure that they are aware that they should speak/read clearly in English and Hindi.

Background Questionnaire

Ask the participants to complete the background questionnaire, which should be the on the second page of the question booklet.
Answer any questions if asked to ensure understanding. Once completed, ask them to start another test and wait for instructions.

TEST 1

Reading Measure

Single Word Reading Test

Instructions:

Once student is ready for the test, give the following instructions.

"Can you please read each word clearly and point your finger on the same word you are reading?" Instructions could be repeated once for older children and twice for younger ones.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given one, whereas an incorrect score is given zero. The total score is determined by adding all the correct items, producing a total out of 15.

Score: one for right answer and zero for wrong or unattempt.

TEST 2 and 3

Phonological awareness measure

Sound Isolation Tests (initial and final sounds)

Instructions:

Once student is ready for the test, give the following instructions:

Initial Sounds: "Listen carefully for sounds in a word I say. Tell me the first sound you hear of each word or the sound you hear at the beginning of each word I say.

For Example. If I say 'car', you will say /k/ or if I say 'Cheap' then you will say /ch/.

Final Sounds: "Listen carefully for sounds in a word I say. Tell me the final sound you hear of each word or the sound you hear at the ending of each word I say.

For Example. If I say 'Dot', you will say /t/ and If I say 'south' then you will say 'th'.

Each word should be clear for the child. One repetition may be given for all words and ask again which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each question item should be entered into the spread sheet – a correct score is given 1, whereas an incorrect score is given 0.

The total score is determined by adding all the correct items, producing a total out of 10.

Phonological awareness measure

Sound Deletion Test

Instructions:

Once student is ready for the test, give the following instructions.

For KG and grade 1, "Can you say the word without beginning sound? After that you will make a new word."

For example, say 'fan', now say it again but without beginning sound of /f/ then it became 'an' and If I say 'cat' and say cat without sound of /k/ then it would be 'at'.

For grade 2 and grade 3, examiner can ask for the deletion of first or middle either end sound out of given word.

"Can you say the word without first, middle or end sound? After that you will make a new word."

For example, say 'cloud', now say it again but without sound of /k/ then it became 'loud' and If say a word 'teach' but don't say sound of /ch/ in teach then new word would be 'tea'.

Each word and sound of letters should be clear for the child. One repetition may be given for all words and ask again which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given 1, whereas an incorrect score is given 0. The total score is determined by adding all the correct items, producing a total out of 10.

Score: 1 for right answer and 0 for wrong or unattempt.

TEST 5

Phonological awareness measure

Sound Blending Test

(Only for KG and Grade 1)

Instructions:

Once student is ready for the test, give the following instructions.

For KG and grade 1, "Can you mix the sounds I will say? After that you will make a new word."

For example, say /k/ /a/ /t/, now make a word from these sounds then it became 'cat' and if I say sounds /h/ /e/ /n/ then after mixing the sound the word would be 'hen'.

Each sound of letters should be clear for the child. One repetition may be given for all sounds in a word and ask again, which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given 1, whereas an incorrect or no answer is given 0. The total score is determined by adding all the correct items, producing a total out of 10.

TEST 5

Phonological awareness measure

Sound Substitution Test

(Only for grade 2 and 3)

Instructions:

Once student is ready for the test, give the following instructions.

For grade 2 and grade 3, examiner can ask the child to replace the initial or final sound of the word and replace it with another sound to make a new word.

Question ask to child "Can you replace the sound of a letter that I will speak, with the sound that I will tell you to replace? After that you will make a new word."

For example, say 'file', now say it again but replace the sound of /f/ with /m/ then it became 'm' from 'file' and if in word 'clam' /m/ replace by /p/ ending sound then the new word would be 'clap'.

Each sound of letters should be clear for the child. One repetition may be given for all sounds in a word and ask again, which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given 1, whereas an incorrect score is given 0. The total score is determined by adding all the correct items, producing a total out of 10.

TEST 6

Morphological Awareness

Sentence Completion Test

(Only for KG and grade 1)

Instructions:

Once student is ready for the test, give the following instructions.

For KG and grade 1, "Can you fill in the blanks orally? After that you will make a complete sentence, with selecting a correct word which fits in the sentence correctly."

"I am going to give you and then an option of two words. Use the correct word out of the option that I gave you, which fits with the sentence. For example, I will give you the sentence "my uncle is a --------------.' Then option of two words; farm/farmer. Now I want you to use the correct word to fill in the blank and make the sentence complete with a suitable word, which is *farmer*.

Each sentence and optional words should be clear for the child. One repetition may be given for all sentences and options and ask again, which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given 1, whereas an incorrect score is given 0. The total score is determined by adding all the correct items, producing a total out of 12.

Score: 1 for right answer and 0 for wrong or unattempt.

TEST 6

Morphological Awareness

Base Word Test

(Only for grade 2 and 3)

Instructions:

Once student is ready for the test, give the following instructions.

For grade 2 and grade 3, examiner can ask the child the base words of the given words.

"I am going to give you few words one by one and then for each word you need to tell the base words". For example if I say *'greenish'* then you need to tell that from which word 'greenish' formed and the answer would be *green* or *'Dependable'* formed from *Depend.*

Each word should be clear for the student. One repetition may be given for all words and ask again, which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given 1, whereas an incorrect score is given 0. The total score is determined by adding all the correct items, producing a total out of 10.

Score: 1 for right answer and 0 for wrong or unattempt.

TEST 7

Morphological Awareness

Word Structure Test

Instructions:

Once student is ready for the test, give the following instructions.

From KG to grade three, examiner can ask the child to divide the given words into two meaningful words.

"I am going to give you few words one by one and then you need to divide each word into two meaningful words". For example if I say *'bedroom'* then you need to divide bedroom in to *'Bed'* and *'Room'*. Another example could be *Sunlight*, which would be divided in *'Sun'* and *'Light'*

Each word should be clear for the student. One repetition may be given for all words and ask again, which one is not clear to them.

If the child is slow to respond or confused then repetition will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given 1, whereas an incorrect score is given 0. The total score is determined by adding all the correct items, producing a total out of 10.

Score: 1 for right answer and 0 for wrong or unattempt.

TEST 8

Vocabulary Knowledge

PPVT (Peabody Picture Vocabulary Test)

Instructions:

Once student is ready for the test, give the following instructions.

From KG to grade three, examiner can ask the child to answer the correct picture through putting his/her finger, asked by examiner.

However, the instructions given on the test booklet, the test needs to be taken carefully.

Examiner will say to student "in this task, I will name a picture and then I want you to put your finger on the correct picture out of four given pictures".

Each name of picture should be clear for the student. One repetition may be given for all question pictures.

If the child is slow to respond or confused then repetition of name of the picture will be needed.

Reinforce the child with positive feedback but do not give any corrective feedback during the test session.

Marking

After the testing session is completed, scores for each item should be entered into the spreadsheet – a correct score is given one, whereas an incorrect score is given Zero. The total score is determined by adding all the correct items, producing a total out of 60.

Score: 1 for right answer and 0 for wrong or unattempt.

Appendix J: Hindi measures' instruction booklet for testers

निर्देश पुस्तिका परीक्षक के लिए

सभी हिन्दी परीक्षण

परीक्षण उपयोग से पहले इन निर्देशों को अच्छी तरह से समझ में आ जाना चाहिए।
कि पर्यावरण (प्रकाश / शोर) परीक्षण पूरा करने के लिए उपयुक्त है, और परीक्षकों को उनके आसपास के लोगों से अशांति के बिना सवाल पुस्तिका को पढ़ने के लिए पर्याप्त जगह है।
सुनिश्चित करें कि प्रतिभागियों के उपायों को पूरा करने के लिए निर्देश समझ में आ जाना चाहिए।
प्रत्येक प्रतिभागी को व्यक्तिगत रूप से परीक्षण किया जाएगा।
प्रतिभागी परीक्षण मौखिक रूप से किया जाना चाहिए।

छात्र के लिए परीक्षण स्पष्ट करने के लिए, दो अभ्यास आइटम प्रदान करते हैं। हर एक परीक्षण शुरू करने से पहले दो अभ्यास आइटम बच्चों को समझाए जाएंगे, जो सवाल पुस्तिका में परीक्षण शुरू करने से पहले दिए हुए हैं ।

पृष्ठभूमि प्रश्नावली

पृष्ठभूमि प्रश्नावली, जो दूसरा पन्ने पे होना चाहिए, पूरा करने के लिए प्रतिभागियों से पूछो।

नम्रता से मौखिक रूप से सवालों के जवाब देने को प्रतिभागियों से पूछो।
सवाल अगर जरूरत हो दोहराएँ।

एक बार जब पूरा हो, उन्हें एक और परीक्षण शुरू करते हैं और आगे के निर्देशों के लिए प्रतीक्षा करने के लिए पूछना है।

<p style="text-align:center">

टेस्ट 1
Reading Measure

शब्द पठन टास्क (Word Reading Test)

</p>

सामग्री: 15 विभिन्न शब्दों की एक तालिका।

निर्देश:

कृपया आप प्रत्येक शब्द स्पष्ट रूप से पढ़ें, तथा शब्द पर अपनी उंगली रखे।

अंकन

परीक्षण सत्र के बाद, हर सवाल का स्कोर शीट में दर्ज किया जाना चाहिए - सही स्कोर के लिए 1 दिया जाता है, जबकि एक गलत स्कोर के लिए 0 दिया जाता है।

कुल स्कोर सभी सही उत्तरों को जोड़कर, 15 में से कुल उत्पादन से निर्धारित होता है।

Phonological awareness measure

स्वनिम अलगाव टास्क (Sound Isolation Test)

(Initial and final sounds)

प्रशिक्षण: छात्र के लिए काम स्पष्ट करने के लिए, बच्चे के लिए दो अभ्यास आइटम प्रदान करते हैं।

निर्देश:

(शुरुआत ध्वनि के लिए) ध्यान से एक शब्द कहने में एक ध्वनि के लिए सुनो। मुझे आप प्रत्येक शब्द के बारे में पहली ध्वनि बताओ। उदाहरण के लिए। अगर हम ' अक्षर ' कहते हैं, आप बताएँगे (/अ/), अगर हम 'प्यास' कहते हैं, तो आप बताएँगे (/प/)

(अंतिम ध्वनि के लिए) अब मैं आप से, हर शब्द कहने के खत्म होने वाली ध्वनि सुनना चाहती/ता हैं। उदाहरण के लिए यदि मुझे कहना होगा 'गाडी' तो आप बताएँगे (/ई/), अगर हम 'मामा' कहते हैं, आप बताएँगे (/आ/)

प्रत्येक शब्द और ध्वनि बच्चे के लिए स्पष्ट होना चाहिए। सभी शब्दों के लिए एक पुनरावृत्ति दी जा सकती है और फिर से पूछें कि उनमें से कौन सा स्पष्ट नहीं है।

यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी।

बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन (Marking)

परीक्षण सत्र के बाद, हर सवाल का स्कोर शीट में दर्ज किया जाना चाहिए - सही स्कोर के लिए 1 दिया जाता है, जबकि एक गलत स्कोर के लिए 0 दिया जाता है।

कुल स्कोर सभी सही उत्तरों को जोड़कर, 10 में से कुल उत्पादन से निर्धारित होता है।

टेस्ट 4
Phonological awareness measure

(Sound Deletion Test)

ध्वन्यात्मक जागरूकता
ध्वनि विलोपन परीक्षण

निर्देशः
आपको बताना है बताई गई ध्वनि के बिना शब्द।
एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।

<u>केजी और ग्रेड 1 के लिए,</u> "क्या आप शुरुआत की ध्वनि के बिना शब्द कह सकते हैं?"
उसके बाद आप एक नया शब्द बनाएंगे। ”
उदाहरण के लिए, उदाहरण के लिए, कहते हैं' नया ', अब फिर से यह कहते हैं लेकिन
/न/ की आवाज के बिना तो यह बजाय 'नया' के 'या' बन गया, इसी तरह 'इधर' में से /इ/
की आवाज हटा दें तो 'इधर' बन गया 'धर'।

<u>ग्रेड 2 और ग्रेड 3 के लिए,</u> परीक्षार्थी दिए गए शब्द में से पहली या मध्य या अंत ध्वनि को
हटाने के लिए कह सकते हैं।
“क्या आप पहली या मध्य या अंत ध्वनि के बिना शब्द कह सकते हैं? उसके बाद आप
एक नया शब्द बनाएंगे। ”
उदाहरण के लिए, बाल्टी: /ल/ की आवाज के बिना / तो 'बाल्टी' बन गया 'बाटी'; काटा:
शब्द के अंतिम आवाज /आ/ के बिना काटा, बन गया 'काट'

प्रत्येक शब्द और ध्वनि बच्चे के लिए स्पष्ट होना चाहिए। सभी शब्दों के लिए एक
पुनरावृत्ति दी जा सकती है और फिर से पूछें कि उनमें से कौन स्पष्ट नहीं है।
यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी।
बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान
कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन

परीक्षण सत्र पूरा होने के बाद, प्रत्येक आइटम के स्कोर को स्प्रेडशीट में दर्ज किया जाना
चाहिए - एक सही स्कोर 1 दिया जाता है, जबकि एक गलत स्कोर 0. दिया जाता है। कुल
स्कोर सभी सही उत्तरों को जोड़कर निर्धारित किया जाता है, जो कुल स्कोर का उत्पादन
करता है 10।

स्कोर: सही उत्तर के लिए 1 और गलत के लिए 0।

टेस्ट 5

Phonological awareness measure

Sound Blending (only for KG and grade 1)

ध्वन्यात्मक जागरूकता
ध्वनि सम्मिश्रण परीक्षण
(केवल केजी और कक्षा 1 के लिए)

निर्देश:

एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।
KG और ग्रेड 1 के लिए, "क्या आप मेरे द्वारा कहे जाने वाले ध्वनियों को मिला सकते हैं? उसके बाद आप एक नया शब्द बनाएंगे। "
उदाहरण के लिए, क + ल + श, अब इन ध्वनियों से एक शब्द बनाएं तो यह 'कलश,' बन गया कलश और अगर मैं कहता हूं कि ध्वनि क + म + ल तो ध्वनि मिश्रण के बाद शब्द होगा 'कमल'

शब्द की प्रत्येक ध्वनि बच्चे के लिए स्पष्ट होनी चाहिए। एक शब्द में सभी ध्वनियों के लिए एक पुनरावृत्ति दी जा सकती है और फिर से पूछ सक्ते हैं कि कौन सा उन्हें स्पष्ट नहीं है। यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी। बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन

परीक्षण सत्र पूरा होने के बाद, प्रत्येक आइटम के स्कोर को स्प्रेडशीट में दर्ज किया जाना चाहिए - एक सही स्कोर 1 दिया जाता है, जबकि एक गलत या कोई जवाब नहीं दिया जाता है। 0. कुल स्कोर सभी सही उत्तरों को जोड़कर निर्धारित किया जाता है, कुल उत्पादन 10 में से।
स्कोर: सही उत्तर के लिए 1 और गलत के लिए 0।

टेस्ट 5

Phonological awareness measure

Sound Substitution Test (only for grade 2 and 3)

ध्वन्यात्मक जागरूकता
ध्वनि प्रतिस्थापन परीक्षण
(केवल कक्षा 2 और 3 के लिए)

निर्देश:

एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।
ग्रेड 2 और ग्रेड 3 के लिए, परीक्षक शब्द की प्रारंभिक या अंतिम ध्वनि को बदलने के लिए बच्चे को कह सकता है और एक नया शब्द बनाने के लिए इसे दूसरी ध्वनि के साथ बदल सकता है।
प्रश्न बच्चे से पूछें "क्या आप उस अक्षर की ध्वनि को बदल सकते हैं जिसे मैं बोलूंगा/गी, जिस ध्वनि के साथ मैं आपको बदलने के लिए कहूंगा? उसके बाद आप एक नया शब्द बनाएंगे। "
उदाहरण के लिए, 'आम' कहें, अब इसे फिर से कहें लेकिन / आ / की ध्वनि को प्रतिस्थापित करें /श/ की ध्वनि के साथ फिर यह 'आम' से बन गया 'शाम' और यदि सारी शब्द में /स/ प्रतिस्थापित हो रहा है /न/ के साथ तब नया शब्द 'नारी' होगा।

शब्दों की प्रत्येक ध्वनि बच्चे के लिए स्पष्ट होनी चाहिए। एक शब्द में सभी ध्वनियों के लिए एक पुनरावृत्ति दी जा सकती है और फिर से पूछ सकती है कि कौन सा उन्हें स्पष्ट नहीं है। आम with a /श/ would be शाम; सारी with a /न/ would be नारी
यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी।
बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन

परीक्षण सत्र पूरा होने के बाद, प्रत्येक आइटम के स्कोर को स्प्रेडशीट में दर्ज किया जाना चाहिए - एक सही स्कोर 1 दिया जाता है, जबकि एक गलत स्कोर 0. दिया जाता है। कुल स्कोर सभी सही उत्तरों को जोड़कर निर्धारित किया जाता है, जो कुल स्कोर का उत्पादन करता है।

टेस्ट 6

Morphological Awareness

Sentence Completion Test (Only for KG and grade 1)

आकृति विज्ञान संबंधी जागरूकता
वाक्य पूर्णता परीक्षण
(केवल केजी और कक्षा 1 के लिए)

निर्देश:

एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।

"क्या आप रिक्त स्थान को मौखिक रूप से भर सकते हैं? आप एक सही शब्द का चयन करने के साथ पूरा वाक्य बनाएंगे, जो वाक्य में सही ढंग से फिट बैठता है। "

"मैं तुम्हें और फिर दो शब्दों का एक विकल्प देने जा रहा/ही हूं। उस विकल्प से सही शब्द का उपयोग करें जो मैंने आपको दिया था, जो वाक्य के साथ फिट बैठता है।

उदाहरण के लिए, मैं आपको वाक्य दूंगा/गी " यह जमीन कई ------------- के बीच विभाजित की गई है। और फिर दो शब्दों का विकल्प दूंगा/गी (किसानों/ किसान)। अब मैं चाहता/ती हूं कि आप रिक्त शब्द को भरने के लिए सही शब्द का उपयोग करें और एक उपयुक्त शब्द के साथ वाक्य को पूरा करें, जो 'किसान' है।

प्रत्येक वाक्य और वैकल्पिक शब्द बच्चे के लिए स्पष्ट होना चाहिए। सभी वाक्यों और विकल्पों के लिए एक पुनरावृत्ति दी जा सकती है और फिर से पूछ सकते हैं कि कौन सा उन्हें स्पष्ट नहीं है।

यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी। बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन

परीक्षण सत्र पूरा होने के बाद, प्रत्येक आइटम के स्कोर को स्प्रेडशीट में दर्ज किया जाना चाहिए - एक सही स्कोर 1 दिया गया है, जबकि एक गलत स्कोर 0. दिया गया है। कुल स्कोर सभी सही उत्तरों को जोड़कर निर्धारित किया गया है, कुल स्कोर का उत्पादन करता है।

स्कोर: सही उत्तर के लिए 1 और गलत या असंबद्ध के लिए 0।

टेस्ट 6

Morphological Awareness

Base Word Test (Only for grade 2 and 3)

आकृति विज्ञान संबंधी जागरूकता
आधार शब्द परीक्षण
(केवल कक्षा 2 और 3 के लिए)

निर्देश:

एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।

ग्रेड 2 और ग्रेड 3 के लिए, परीक्षक बच्चे को दिए गए शब्दों के आधार शब्द पूछ सकते हैं।

"मैं आपको एक-एक करके कुछ शब्द देने जा रहा/ही हूं और फिर प्रत्येक शब्द के लिए आपको आधार शब्द बताने की जरूरत है"। उदाहरण के लिए अगर मैं 'घूमना' = घूम कहता हूं तो आपको यह बताने की जरूरत है कि 'घूमना' शब्द किस शब्द से बना है और जवाब 'घूम' होगा या जैसे 'बंदरों' शब्द का आधार शब्द 'बंदर' है।"

छात्र के लिए प्रत्येक शब्द स्पष्ट होना चाहिए। सभी शब्दों के लिए एक पुनरावृत्ति दी जा सकती है और फिर से पूछ सकते हैं, जो उनके लिए स्पष्ट नहीं है।

यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी। बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन

परीक्षण सत्र पूरा होने के बाद, प्रत्येक आइटम के स्कोर को स्प्रेडशीट में दर्ज किया जाना चाहिए - एक सही स्कोर 1 दिया जाता है, जबकि एक गलत स्कोर 0 दिया जाता है। कुल स्कोर सभी सही उत्तरों को जोड़कर निर्धारित किया जाता है, जो कुल स्कोर का उत्पादन करता है।

स्कोर: सही उत्तर के लिए 1 और गलत या असंबद्ध के लिए 0।

टेस्ट 7

Morphological Awareness

Word Structure Test

आकृति विज्ञान संबंधी जागरूकता
शब्द संरचना परीक्षण

निर्देश:

एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।
<u>केजी से ग्रेड तीन तक</u>, परीक्षक बच्चे को दिए गए शब्दों को दो सार्थक शब्दों में विभाजित करने के लिए कह सकता है।
"मैं आपको एक-एक करके कुछ शब्द देने जा रहा/ही हूं और फिर आपको प्रत्येक शब्द को दो सार्थक शब्दों में विभाजित करना होगा"। उदाहरण के लिए अगर मैं 'राजकुमार' कहता हूं तो आपको 'राजकुमार' को 'राज' और 'कुमार' में विभाजित करना होगा। एक और उदाहरण 'कलाकृति' हो सकता है, जिसे ' कला ' और ' कृति ' में विभाजित किया जाएगा।

छात्र के लिए प्रत्येक शब्द स्पष्ट होना चाहिए। सभी शब्दों के लिए एक पुनरावृत्ति दी जा सकती है और फिर से पूछ सकते हैं, जो उनके लिए स्पष्ट नहीं है।

यदि बच्चा प्रतिक्रिया देने में धीमा है या भ्रमित है तो पुनरावृत्ति की आवश्यकता होगी। बच्चे को सकारात्मक प्रतिक्रिया के साथ प्रोत्साहित करें लेकिन परीक्षण सत्र के दौरान कोई सुधारात्मक प्रतिक्रिया न दें।

अंकन

परीक्षण सत्र पूरा होने के बाद, प्रत्येक आइटम के स्कोर को स्प्रेडशीट में दर्ज किया जाना चाहिए - एक सही स्कोर 1 दिया जाता है, जबकि एक गलत स्कोर 0 दिया जाता है। कुल स्कोर सभी सही उत्तरों को जोड़कर निर्धारित किया जाता है, जो कुल स्कोर का उत्पादन करता है।
स्कोर: सही उत्तर के लिए 1 और गलत या असंबद्ध के लिए 0।

टेस्ट 8

Vocabulary Knowledge

HVT (Hindi Vocabulary Test)

शब्दावली ज्ञान

(हिंदी शब्दावली परीक्षण)

सामग्री: 120 काले और सफेद चित्रों के साथ 30 ए 4 आकार के कागज। प्रत्येक कागज पर चार चित्र छपे होंगे। यह चित्र बच्चों के दैनिक उपयोग और पर्यावरण से संबंधित होंगे।

निर्देश:

एक बार जब छात्र परीक्षा के लिए तैयार हो जाता है, तो निम्नलिखित निर्देश दें।
<u>केजी से ग्रेड तीन तक</u>, परीक्षक क्रम में प्रत्येक छात्र को 30 कागज दिखाएगा। छात्र को प्रत्येक कागज के लिए सही तस्वीर के साथ एक लक्षित शब्द से मेल खाने के निर्देश दिए जाएंगे। छात्र को, परीक्षक के द्वारा पूछे गए सही तस्वीर पर उंगली रखने का निर्देश दिया जाएगा। बच्चों को ऐसे 30 कागज दिखाए जाएंगे। एक अंक सही उत्तर के लिए और गलत के लिए या कोई प्रयास नहीं होगा तो जीरो दिया जाएगा।

उदाहरण के लिए - परीक्षक बच्चों को चार फलों के चित्र दिखाता है (आम, अमरुद, सेब, पपीता) और पूछता है इनमे से 'पपीता' कौन सा है? उत्तर में, बच्चे को पपीते पर उंगली रखनी है।

Appendix K: Ethical Approval Letter

UC
UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 364 2987, Extn 45588
Email: human-ethics@canterbury.ac.nz

Ref: 2016/34/ERHEC

22 August 2016

Nidhi Sharma
STED
UNIVERSITY OF CANTERBURY

Dear Nidhi

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal "Influence of Phonological and Morphological Awareness on Reading Skills in Hindi/English Young Bilinguals" has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 25th July and 11th August.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

pp   *R. Robinson*
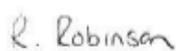
Patrick Shepherd
Chair
Educational Research Human Ethics Committee

F   E   S