

**META-PHONOLOGICAL ABILITIES IN MONOLINGUAL AND  
BILINGUAL CHILDREN: A COMPARATIVE STUDY**

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## **Certificate**

This is to certify that this dissertation entitled “**Meta-phonological Abilities in Monolingual and Bilingual Children: A Comparative Study**” is a bonafide work in part fulfillment for the degree of Master of Science (Speech-Language Pathology) of the student (Registration No. 07SLP018). This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore  
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## Declaration

This dissertation entitled “**Meta-phonological Abilities in Monolingual and Bilingual Children: A Comparative Study**” is the result of my own study and has not been submitted earlier in any other University for the award of any Diploma or Degree.

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**DEDICATED**

**TO**

**MAMMA, PAPPA,**

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## CHAPTER 1

### INTRODUCTION

“Meta-linguistic ability is the ability to reflect upon and manipulate the structural features of spoken language, treating language itself as an object of thought” (Tunmer & Harriman, 1984). This term was first used by Cazden (1974) to describe and explain the transfer of linguistic knowledge and skills across languages. The nature of meta-linguistic awareness is not defined clearly. Over the last few decades the studies in the area of meta-linguistic skills have been attempted due to its relationship with reading acquisition.

The three main theoretical perspectives that are held in reference to reading acquisition and meta-linguistic skills are:

1. Meta-linguistic skills are required for reading acquisition.
2. Meta-linguistic and reading skills are interactive.
3. Meta-linguistic skills are as a consequence of literacy acquisition.

Meta-linguistic abilities play vital roles in different stages of reading acquisition in which meta-phonological skills are one of the facets of meta-linguistic ability. Meta-phonological abilities refer to an individual’s explicit awareness and the ability to process and manipulate the speech sound segments of words. This requires non-lexical processing which has to look beyond the meaning of a word to focus on the sound structure of the word. In the recent years, predominantly the meta-phonological skills have been crucially linked to reading and acquisition of reading. The relationship between meta-phonological skills, reading and spelling ability has been well documented (Torgeson,

Wagner & Rashotte 1994; Macdonald & Cornwall, 1995; Troia, 2004). Meta-phonological ability or phonological awareness encompasses many different skills, but all of these skills develop from the same underlying ability (Anthony & Lonigan, 2004; Schatschneider, Francis, Foorman, Fletcher & Mehta, 1999). Morphological awareness on the other hand reflects on the ability to understand and correctly use small words, letters, and letter combinations that change the meaning of a word. Strong correlations between phonological and morphological awareness are apparent throughout the elementary years (Deacon & Kirby, 2004).

Hence, research in this field shows that both phonological and morphological awareness are important for the acquisition of reading and spelling skills during the early years of education. Further, morphological knowledge contributes independently for fine-tuning of vocabulary expansion and reading skills.

The development of phonological awareness skills across children are learnt in the same order. Awareness of rhyme and breaking words into syllables are two of the early meta-phonological skills to emerge. There are several factors affecting the development of these skills in children. There appears to be a 'protective influence' that is usually an environmental or experiential factor that improves the outcome for a child with respect to development of meta-phonological and reading skills. Protective influences such as social factors and print exposure may have an effect in the child's early literacy development. Linguistic aspects such syntax, semantics, learning to read does play key roles in the

development of meta-phonological skills. Tunmer (1989) reports that the syntactic awareness, seems to be an important independent contributor to early reading skills. Cognitive (verbal IQ such as abstract concepts, verbal factual knowledge, vocabulary and verbal reasoning and inference, attention and verbal memory skills etc..) and non-cognitive (home environment, social and family factors) predictors influence development of oral and written language skills. Apart from these factors print exposure i.e. the exposure children have for text, whether in the form of alphabet books, storybooks comics or magazines influence early literacy experiences. An added relevant factor, clearly strongly related to print exposure is how often parents read to their children. (Scarborough & Dobrich, 1994; Sénéchal et.al, 1998).

### **Meta-phonological abilities and reading achievement**

Early reading processes have been understood by studying the ‘predictors’. These predictors are the skills or abilities that have been demonstrated to contribute to reading development. The most-studied predictors of early reading skills are the meta-phonological abilities. Meta-phonological abilities begin to emerge before children start to learn to read, and is a powerful and consistent predictor in beginning readers. Though phonological awareness is a powerful predictor of reading achievement, both in the short and long term, acquisition of alphabetic principles forms the foundation for children’s rapid expansion of literacy skills.

### **Bilingualism and meta-linguistic abilities**

Meta-linguistic awareness is the primary variable mediating the positive effects of bilingualism on academic achievement. There are reports suggesting that fluent

bilingualism results in increased meta-cognitive/meta-linguistic abilities which in turn facilitate reading acquisition. Thus, resulting in higher levels of academic achievement. It seems reasonable to assume that not all thought processes are enhanced through a bilingual experience and that those cognitive tasks, which rely more on language, will benefit most from that experience (Hamers & Blanc, 1983).

Being exposed to more than one linguistic code has shown to enhance meta-cognitive skills and allow such children to surpass their monolingual peers. The most commonly studied phenomenon in bi-literacy learning that transfers across languages and enhances literacy learning among bilingual learners is “meta-linguistic awareness” (Koda, 2008). Meta-linguistic transfer is the application of particular meta-linguistic awareness and knowledge acquired in students’ L1 to speaking, reading and writing in their L2.

To summarize, the experiential evidences propose that not all aspects of cognition is enhanced as a result of bilingual experience. However, it has also been documented in literature that cognitive tasks relying more on language will benefit the most and children exposed to more than one linguistic code show an ascendancy of advanced meta-cognitive skills than their monolingual peers.

As a result, taking into consideration the Indian milieu the current study was carried out to investigate the meta-phonological and reading abilities in Kannada

speaking monolingual and Kannada-English speaking bilingual children on different meta-phonological and reading tasks.

### **NEED FOR THE STUDY**

Various studies have been documented in the area of meta-phonological abilities and reading skills. These studies have focused on the development and factors influencing the acquisition of the meta-phonological abilities and reading in monolingual and bilingual children. The literature basically refers to Western studies. Hence, in the Indian context, this domain provides the motivational grounds for this study. Thus, the present study was undertaken with the need to compare the meta-phonological abilities and reading skills on various meta-phonological and reading tasks in monolingual and bilingual children in the age range of 8-9 years.

### **AIM OF THE STUDY**

The current study was conducted to compare the meta-phonological and reading abilities in monolingual and bilingual children. Following were the objectives considered for the study:

- To study the pattern of meta-phonological and reading skills in monolingual (Kannada) and bilingual (Kannada and English) children, in the age range of 8-9 years.
- To explore the various factors influencing the development of meta-phonological abilities in the age range of 8-9 years between two groups.

## CHAPTER 2

### REVIEW OF LITERATURE

Meta-linguistic abilities appear to emerge in children as young as 2 years of age (Clark, 1978). These abilities may be demonstrated as spontaneous corrections of one's own pronunciations, word forms, word order, choice of language in case of bilinguals, comments and play with different linguistic units and/or segmentations of words into syllables.

There are four broad levels of meta-linguistic abilities (Tunmer & Bowey, 1984).

1. Word awareness
2. Form awareness
3. Phonological awareness
4. Pragmatic awareness

Meta-linguistic abilities play vital roles in different stages of reading acquisition. Phonological awareness and morphological awareness are meta-linguistic skills that are important for reading. Hodson (2008) prefers the term *meta-phonological awareness*. Meta-phonology is defined as the ability to reflect on and pay attention to the phonological structure of language. Meta-phonological skills include rhyming, syllable segmentation, and sound blending etc. Vast research in the area of meta-linguistic and reading skills have been documented both in Western and Indian context. However, the researchers have used different tasks to understand the core basis and their implications

in typically developing children as well as the disordered population such as children with learning disability, specific language impairment and other communication disorders. The amount of work which has been documented is either on monolingual or bilingual children especially in Western perspective. The present research was aimed to investigate the meta-phonological skills and its outcome on reading abilities in monolingual and bilingual children in the age range of 8-9 years. The review of literature has been framed keeping in mind the different aspects of meta-phonological skills and the variables influencing either the learning or acquisition and its effect on literacy skills. Broadly the review has been discussed under the following sections:

- Factors influencing the development of the meta-phonological and reading skills
- Linguistic measures
- Meta-phonological abilities/phonological awareness
- Cognitive/meta-cognitive measures

### **Factors influencing the development of the meta-phonological and reading skills**

There are different factors affecting the development of meta-phonological skills and its relation with reading abilities. The major factors which might have an effect on the development of these skills are age, gender, socio-economic status (SES), language learning environment, speech sound accuracy, literacy instruction. Burt, Holm and Dodd (1999) investigated phonological awareness and processing skills using eight tasks i.e. consistency of word production, phonological variability according to speech production task, non-word imitation, syllable segmentation, rhyme awareness, alliteration awareness,



phoneme isolation and phoneme segmentation. Their results indicated that girls and boys performed equally. The socio-economic status significantly affected the performance of children on six of the eight tasks. The age factor significantly correlated with performance on tasks targeting alliteration, non-word imitation, phonological variability, and phoneme isolation and segmentation where the older children were more phonologically aware than the younger children.

Dodd and Carr (2003) conducted a study on 83 normally developing children between the ages of 4:11 and 6:4 (years: months) using letter-sound recognition (i.e., point to the appropriate letter when the letter's sound is given), letter-sound recall (i.e., say the letter's sound) and letter reproduction (i.e., write the letter when the letter's sound is given) tasks. They reported that female participants performed no differently from male participants. It was also found that age of the children did not influence the performances of the tasks. However, they reported that socioeconomic status had significant influence on the level of development for all tasks.

Duncan, Cole, Seymour and Magnan (2006) examined whether the proposed developmental sequence for syllables, onset-rime and phoneme varies according to the characteristics of a child's native language. They conducted two experiments in which they compared the phonological segmentation skills of English speakers aged 4:11, 5:3 and 6:5 (years: months) and French speakers aged 5:6 and 6:8 (years: months) in the first experiment. In the second experiment they assessed the performance in the common unit task for the English speakers aged 4:7, 5:7 and 6:11 (years: months) and French speakers aged 4:7, 5:0 and 6:7 (years: months). The experiments revealed cross-linguistic

differences in the processing of syllables prior to school entry with French speakers exhibiting a greater consistency in manipulating syllables. They also reported that meta-phonological abilities emerge in both languages once reading instruction is introduced. The rime (final syllable) awareness appears to follow rather than precede this event. Hence, the emergence of phonological awareness did not show a universal pattern but rather was subject to the influence of both native language and literacy.

McDowell, Lonigan and Goldstein (2007) examined whether age was the moderator of the relations between predictor variables and phonological awareness. It was a cross-sectional study involving 700 participants between 2 to 5 years of age. The researchers controlled the socioeconomic status (SES) variable. The participants were identified as being from homes of lower or higher SES based on preschool funding source. They completed two measures of vocabulary, eight measures of phonological awareness, and two measures of speech sound accuracy. The results of this study indicated that SES, age, speech sound accuracy, and vocabulary each contributed unique variation to provide insight into phonological awareness. Age improved the relations between speech sound accuracy and phonological awareness and between SES and phonological awareness but not between vocabulary and phonological awareness.

A study using phonemic awareness stimulation and the comparison of its effects between genders was carried out on 18 boys and 18 girls, all with typical language development, in their grade II. The phonological awareness stimulation program was applied in the classroom. The results indicated that male and female participants presented an improvement in their performance in all the phonological awareness tasks

after the application of the stimulation program and this improvement was statistically significant. It was observed that prior to the application of the stimulation program; there was a significant difference between boys and girls in the task involving the detection of a phoneme in the last position. After stimulation, this difference remained significant in the same task, and was also statistically significant for the tasks of phonemic segmentation of words with six phonemes and phoneme reversion of words with two or three phonemes. They concluded that girls performed better in the majority of the phonemic awareness tasks, and that the program was effective in stimulating these tasks (Moura, Mezzomo & Cielo, 2009).

To sum up, the studies on the factors influencing the development of meta-phonological skills and its influence on reading explains that factors like gender, age, SES, language learning experiences, parental scaffolding, literacy instruction do have distinctive divergence on the maturity of these skills.

### **Linguistic Measures**

Pena, Bedore and Rappazzo (2003) investigated predominantly Spanish-speaking, predominantly English-speaking, and Spanish-English bilingual children's performance on a battery of semantic tasks. Six semantic tasks (associations, characteristic properties, categorization, functions, linguistic concepts, and similarities and differences) were developed in Spanish and English. Each task consisted of receptive and expressive items. Predominantly Spanish-speaking children completed the tasks in Spanish; predominantly English-speaking children completed the tasks in English, and Spanish-English bilingual

participants completed the tasks in Spanish and English. Their results indicated that children in all three groups achieved similar average levels of performance on the assessment battery. However, there were differences in the patterns of performance for English and Spanish, and across groups in the same language.

Manis, Lindsey and Bailey (2004) investigated on the development of reading in Spanish speaking English language learners from kindergarten through grade II. They used word identification and reading comprehension tasks out of which four categories of predictor variables were obtained in Spanish for kindergarten and in English for grade I which included the print knowledge, expressive language (as measured by vocabulary and sentence repetition tasks), phonological awareness, and rapid automatic naming (RAN). Results indicated a distinct amount of cross-language transfer from Spanish to English and developing English-language skills (particularly phonological awareness and RAN) mediated the contribution of Spanish-language variables to later reading. Further analysis revealed stronger within- than cross-language associations of expressive language with later reading, suggesting that some variables function cross-linguistically, and others within a particular language. Furthermore, the results have suggested that some of the cognitive factors underlying reading disabilities in monolingual children (e.g., phonological awareness and RAN) may be important for understanding of reading difficulties in bilingual children.

Chow, McBride-Chang, Cheung, Chow and Choi (2006) investigated the meta-linguistic skills and its associations with the vocabulary knowledge in languages with contrasting phonological and morphological properties. Tasks of phonological awareness

and morphological awareness, other reasoning, literacy-related skills, and measures of vocabulary knowledge in Chinese and English were administered on Chinese kindergarten children learning English as a second language. The results of their study indicated that syllable-level awareness strongly correlated with Chinese vocabulary knowledge but not phoneme onset awareness. Phoneme onset awareness but not syllable awareness was associated with English vocabulary knowledge. In contrast, measures of morphological awareness, which were strongly associated with syllable awareness.

Thus, the studies related to the meta-phonological and reading skills in relation to linguistic skills (vocabulary, receptive- expressive language, print knowledge, sentence repetition, and rapid automatic naming tasks) are influential in the growth of these skills.

### **Meta-phonological Abilities/Phonological Awareness**

It is the ability to reflect on and manipulate sub-lexical phonological units such as syllables, onsets, rimes and phonemes. Studies on the investigation of meta-phonological/phonological awareness have utilized:

- Battery/series of meta-phonological tasks

However some of studies have used few of the tasks for assessing meta-phonological/phonological awareness which include:

- Rhyming vs. non-rhyming word pairs
- Syllable stripping
- Word, pseudo-word and non-word reading

- Phoneme deletion

### **Series/ Battery of meta-phonological of tasks**

Over the decades researchers have investigated the meta-phonological awareness and its association with reading skills. The findings have been equivocal. Few reports suggest that it is a requirement for reading (Elkonin, 1973; Liberman et.al 1977; Bradley & Bryant, 1983). Other researchers like Morais et.al (1979), Liberman and Mattingly (1985), Read et.al (1986) report that these skills are as a consequence of learning to read. Few other researchers report that meta-phonological skills and reading are interactive i.e. they are reciprocal. (Ehri, 1979; Bryant & Goswami, 1987; Prefetti, Beck, Bell & Hughes, 1987). According to Hakes (1980), these skills correlate not because one causes the other but in view of the fact that both rely on a common underlying cognitive ability.

A longitudinal study by Bradley and Bryant (1983); Blachman (1984); Juel, Griffith and Gough (1986); Mann and Ditunno (1989) observed that performances on tasks of meta-phonological skills in nursery or grade I is a powerful predictor of reading achievement. However, contradicting to this was a study reported by Sunitha (1995) and Rekha (1996) who reported that meta-phonological skills are not essential for learning to read a non-alphabetic script (Kannada), rather they reported that the knowledge of orthographic principles seem to be more significant.

Morais, Bertelson, Carey and Algeria (1979, 1986) and Read, Zhang, Nie and Ding (1986) found that individuals who did not have direct familiarity with alphabetic orthography were unable to carry out phonological segmentation tasks. They concluded

that the ability to hear spoken language as a sequence of phonemes is a by product of experience with an alphabetic orthography. This finding is in harmony with the research reports by Prakash and Mohanty (1989), Malini (1996), Rekha (1996) in Indian children.

According to Read, Zhang, Nie and Ding (1986) some aspects of phonological awareness does not appear to be a natural result of maturation but seems to be a consequence of learning an alphabetic orthography. They also reported that without this instruction, individuals may gain only minimal overt knowledge or awareness of phonemic units.

Mann (1986) conducted a study on Japanese children and reported that who were not exposed to alphabetic writing could successfully perform phonological segmentation tasks by the time they reached grade IV.

Morais (1991) studied the alphabetic and non-alphabetic nature of scripts and reported that the entire writing system need not be alphabetic for the development of meta-phonological awareness. A non-alphabetic writing system would allow such a development to certain degree depending on the specific orthographic features present.

Prakash (1993) investigated the development of reading proficiency in relation to meta-linguistic awareness and reported that the acquisition of literacy in children reading a non-alphabetic script follows two successive stages, firstly the syllable decoding and secondly the syllable decoding + comprehension stages. He accounted these stages to a probable interaction between the nature of orthography and instructional process rather than meta-phonological skills per se.

Prakash, Rekha, Nigam and Karanth (1993) conducted a series of studies. In their first experiment they studied the early stages of literacy in Kannada. The second experiment involved comparison of performance on phonological awareness tasks by Hindi uniliterates and illiterates. In the experiment 3, they compared the performances on phonological awareness tasks by Kannada uniliterates and Kannada-English biliterates. They concluded that one's ability to manipulate the structural features of language is facilitated by literacy in general and by the features of the script employed in literacy in particular.

Bruck and Genesee (1995) compared the meta-phonological abilities in 91 English-speaking children who attended French schools (bilingual group), and 72 age-matched English-speaking children attending English schools (monolingual group). They used a battery of phonological awareness tests in kindergarten and in grade I. They reported that the bilingual children showed heightened levels of phonological awareness skills in kindergarten in the area of onset-rime awareness. By grade I, the pattern of group differences were more complex. The monolingual and bilingual children performed similarly on onset-rime segmentation tasks. The monolingual children had higher phoneme awareness scores than their French-school going peers. This finding was interpreted to reflect the role of literacy instruction on phoneme awareness development. In comparison, the bilingual children had higher syllable segmentation scores than their monolingual peers. They attributed this finding to the role of second language input on phonological awareness.



Karant and Prakash (1996) conducted a longitudinal study in which 70 school going children from upper kindergarten (UKG) to grade II were evaluated on various reading and writing skills, meta-phonological skills, reading comprehension and orthographic skills apart from IQ and vocabulary measures. Their results indicated that children learn to read and write the base syllabary within the 1<sup>st</sup> years of reading the base syllabary, but acquisition of compound / complex syllables is an extensive process lasting for 3 years. Though reading and writing is parallely acquired in 1<sup>st</sup> years, acquisition of writing consistently follows reading in succeeding years. They also reported that on the meta-phonological awareness tasks children performed best on rhyme recognition and syllable stripping with 100% achievement at grade II. Reading comprehension paralleled performances on all other reading tests. The test of orthographic principles served as an efficient discriminator of good and poor readers.

Loizou, Stuart (2003) examined levels of phonological awareness in monolingual and bilingual English and Greek five-year-old children. The participants were divided in four groups: two bilingual (English-Greek, Greek-English) and two monolingual (English, Greek). A set of six phonological tasks were compared. Bilingual children were tested in both English and Greek versions of the tasks; monolingual children were tested for the phonological tasks in their mother tongue only. The results showed that the bilingual English-Greek children significantly outperformed the monolingual English children, but this pattern was not replicated in the bilingual Greek-English/monolingual Greek comparisons.

This difference is discussed in terms of the <sup>1</sup>bilingual enhancement effect. Results also showed that English-Greek bilingual children performed significantly better than Greek-English bilinguals, especially on tasks requiring phoneme awareness. They concluded that learning to read in an alphabetic language promotes the level of phonological awareness.

Surabhi Bharati (2004) investigated the positive influence on language acquisition in bilingual versus trilingual children and also the language specific constraints influencing the phonological awareness of English sub-syllabic units i.e. whether the Universal Grammar (UG) plays any role in the early stages of language acquisition in multilinguals. Participants were divided into two groups i.e. the bilingual and the trilingual/multilingual children who attended English medium school. Other two languages were Telugu, Hindi. They were also interviewed about the exposure to any other languages apart from these three languages. Tasks were phoneme awareness tasks (phoneme counting items, first phoneme in cluster same, final phoneme same), Onset-rime awareness tasks (onset deletion, rime same, singleton onset same, cluster onset same), Syllable awareness tasks (syllable counting items, beginning syllable same and end syllable same items). The results indicated that Universal Grammar (UG) plays an important role in the process of L2 and L3 acquisition and also suggests that Common Underlying Conceptual Base (CUCB) (multicompetence view) (Kecskes and Papp, 2000) that multilinguals seem to possess.

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<sup>1</sup>This seems to occur only when bilingual children are exposed to a second language that is phonologically simpler than their first language as reported by Loizou, Stuart 2003.

Vanasse, Begin-Bertrand, Courc, Lassonde and Beland (2005) investigated the development of meta-phonological abilities and reading abilities in French speaking children between 5-12 years of age. The tasks included were segmentation, blending and inversion at the syllable and the phoneme level, reading of regular and irregular words and non-words, rhyme production and rhyme recognition. They reported that meta-phonological tasks showed a clear developmental progression between kindergarten and grade II. They reported that regular words were easily read in grade II; non-words were adequately decoded in grade III, whereas irregular word reading gradually increased until grade VI and beyond. They also concluded that facilitatory effect between phonological awareness and reading appears to be limited to the phoneme unit.

Ibrahim, Eviatar, Judith (2007) investigated the meta-phonological abilities and its effect in bilingual reading performance, and to what extent do the orthographic characteristics of a language influence reading performance and how does this interact with the effects of phonological awareness. The experiment was carried out on three groups which included the monolingual Hebrew speakers, bilingual Russian-Hebrew speakers, and Arabic-speaking children. Their results indicated that language experience affects phonological awareness, as both Russian-Hebrew bilinguals and the Arabic speakers achieved higher scores on meta-linguistic tests than Hebrew speakers. They also reported orthography affecting reading measures and their correlation with phonological abilities. Children reading Hebrew showed better text reading ability and significant correlations between phonological awareness and reading scores. Children reading Arabic showed a slight advantage in single word and non-word reading over the two Hebrew reading groups, and a very weak relationship between phonological abilities and

reading. They provided a probable reasoning for this phenomenon, that this is due to the additional visual complexity of Arabic orthography.

Shwartz, Geva, Share and Leikin (2007) compared the early Hebrew (L2) literacy development of three groups; two groups of bilinguals-bi-literate and mono-literate Russian-Hebrew speakers, and a third group of monolingual Hebrew-speakers. The researchers used a longitudinal design consisting of a variety of linguistic, meta-linguistic and cognitive tasks and administered these tasks at the commencement of grade I. The results demonstrated that bi-literate bilinguals were far in advance of both mono-literate (Russian-Hebrew) bilinguals and mono-lingual Hebrew-speakers on all reading fluency measures at the end of grade I. Bi-literate bilinguals also showed a clear advantage over mono-literate bilingual and mono-lingual peers on all phonological awareness tasks. The mono-literate bilinguals also demonstrated some modest gains over their monolingual peers in grade I reading accuracy. All three groups performed similarly on L2 linguistic tasks. The findings also suggested that the actual mechanism of cross-linguistic transfer is due to the insight gained into the alphabetic principle common to all alphabetic writing systems and not merely the knowledge of a specific letter-sound code such as the Roman orthography.

Chien, Kao and Wei (2008) in their psycholinguistic study reported the development of phonological awareness in Chinese children acquiring their first language and learning a foreign language at the same time. 82 children aged between 10-11years were tested on Chinese and English phonological awareness tasks. These tests included six tasks, such as syllable awareness, initial phoneme oddity, final phoneme oddity,

medial phoneme oddity, final phoneme deletion and initial phoneme deletion. They found that there was strong association between the English and Chinese phonological awareness. They also concluded that skills in phoneme segmentation and phoneme deletion acquired in Chinese are transferable to English for young Chinese who were beginners in learning foreign language. They also reported that the skills in initial phoneme oddity and initial phoneme deletion were good predictors for success in learning an alphabetic language such as English.

Dodd, So and Lam (2008) conducted two experiments to study the effect of language pair on phonological awareness by comparing monolingual and bilingual children on a variety of phonological awareness tasks. The tasks were syllable, onset rime, and phoneme and tone awareness using detection, deletion and segmentation tasks. In the first experiment they compared bilingual Putonghua-Cantonese children with two matched monolingual control groups. The bilingual group had enhanced phonological awareness. However, the monolingual Putonghua speakers performed better on the phoneme detection task. In the second experiment the researchers compared Cantonese-English bilingual children and controls monolingual in Cantonese. They concluded that there was no overall group difference in phonological awareness abilities and the bilingual children had better tone awareness.

### **Rhyming vs. non-rhyming word pairs**

Goswami and Bryant (1990) and Goswami (1991) reported that the rhyme recognition is the earliest predictor of reading ability for an alphabetic script.

Karant and Prakash (1996) and Rekha (1996) studied the meta-phonological abilities in beginning readers exposed to non-alphabetic script (Kannada). Their results revealed that the development or the advancement of phonological awareness is greatly influenced by alphabet-like features present in the orthography and not by rhymes. They also reported that rhymes may be related to some processing strategies of literacy acquisition and appears to be more associated with syllable awareness than phoneme awareness.

Vasanta (2004) investigated II and V grade Telugu-speaking children for the awareness of phonological and orthographic properties of familiar Telugu words. The study included 3 experiments, focusing on strategies the children use in completing word fragments, the children's ability to judge and generate rhyming words, and the children's strategies in comprehending meanings of orthographically similar rhyming vs. non-rhyming word pairs in a sentence completion task. The results of this study indicated that specific features of semi-syllabic alphabets interact with phonological knowledge during the reading of meaningful words, in such a way that children with more formal instruction are at an advantage in accessing phonological knowledge as compared to children with less able-bodied orthographies.

### **Syllable stripping and oddity**

Lieberman and Mann (1981) reported that syllable awareness is essential for reading prediction in kindergarten. Blachman (1981) found that syllable segmentation was not a significant predictor at grade I for alphabetic script. Treiman and Baron (1981) reported that syllable segmentation is easier than phonological segmentation.

Van Kleeck (1982) reported that oddity tasks require higher cognitive skills than deletion tasks and hence, are late to develop.

Prakash and Chandrika (as cited in Prema, 1997) reported that syllable stripping was the earliest predictor of reading ability in a non-alphabetic script.

In Kannada language, Prema (1997) reported that phoneme stripping is more difficult than syllable stripping. She also reported that children deleted the two special graphemes which have phonemic status in Kannada ('arka' and 'anuswara') which was easier than regular phonemes ('o', 'e'). She attributed this phenomenon to the nature of these special phonemes which enjoy independent graphemic status in Kannada. She also reported that syllable stripping is a sensitive indicator for reading in Kannada speaking children.

### **Word reading, pseudo-word and non-word reading**

Karant and Prakash (1996) in their study reported that acquisition of 'anuswara' leads 'arka' in the lower grades.

Prema (1997) reported that there was a parallel development of 'arka' and 'anuswara' words from third grade onwards.

Duncan and Johnston (1999) examined phonological awareness at the level of phonemes, rhyme and related this to non-word naming ability. Participants included poor readers aged 11 years in comparison with chronological-age controls and 8 year old reading-age controls. Poor reader group was impaired for chronological age in all tasks, and impaired for reading age at non-word naming and phoneme deletion. Furthermore,

phoneme awareness correlated significantly with poor readers' word and non-word reading ability, whereas rhyming skill did not. Therefore, phoneme awareness may be more important than rhyming skill in understanding reading disorders.

Thompson and Johnston (2000) examined the reading disabled children and two (one group of children who were taught phonics and the other group who were not) reading-level matched normal group for phonological processing. The reading disabled children had lower non-word reading performance than the phonics taught controls. However, performance was equivalent to that of the controls without phonics teaching. Hence, the authors have concluded that non-word reading deficit was not in itself a diagnostic of developmental reading disability.

Berninger, Vermeulen, Abbott, McCutchen, Cotton, Cude et.al. (2003) conducted an instructional experiment. 96 II graders with low reading achievement were randomly assigned to one of four conditions (1) explicit and reflective word recognition, (2) explicit and reflective reading comprehension, (3) combined explicit word recognition and explicit reading comprehension, or (4) treated control that only practiced reading skills without any instruction. The results of the study indicated that combined word recognition and reading comprehension treatment increased phonological decoding (pronouncing pseudo-words) significantly more than the treated control and the comprehension only treatment was not significantly different from the treated control.

In a longitudinal study by Hogan, Catts and Little (2005) investigated the meta-phonological abilities and its relationship with reading on kindergarten to grade-IV children using phonetic decoding (i.e., non-word reading) and word reading tasks. Their



findings are two-fold. First, they reported that phonological awareness assessment provides information about reading in kindergarten. Secondly, phonological awareness assessment loses its predictive power at grade-II because at that time phonological awareness and word reading become so highly correlated with each other that phonological awareness does not add information to the prediction of grade –IV reading.

Hamilton, Gillon (2006) investigated the phonological awareness skills of bilingual Samoan children who were exposed to Samoan and English languages. The authors assessed on phonological awareness measures at the syllable, onset-rime and phoneme level in English and Samoan. The results of their study indicated that the phonological awareness skills at phoneme level were comparable in both languages and that the phoneme awareness skills learned in English following formal literacy instruction get transferred to the development of phonological awareness in Samoan language.

Mishra and Stainthorp (2007) investigated relationships between phonological awareness and reading in Oriya and English. Participants were from V grade. The researchers used the measures of phonological awareness, word reading and pseudo-word reading in both languages. The result was twofold, suggesting that phonological awareness in Oriya contributed significantly to reading Oriya and English words and pseudo-words for the children in the Oriya-medium schools and the phonological awareness in English contributed to English word and pseudo-word reading for both groups. Also the contribution of awareness of large phonological units (syllable, onsets and rimes) and small phonological units (phonemes) to reading in each language was investigated. The authors have concluded that the cross-language transfer and facilitation

of phonological awareness to word reading is not symmetrical across languages and it may depend on:

- a. The characteristics of the different orthographies of the languages being learned and
- b. Whether the first literacy language is also the first spoken language.

### **Phoneme deletion**

Durgunoglu and Oney (1999) examined the development of phonological awareness in Turkish and English-speaking kindergarten and grade-I children. The results of their study indicated that the Turkish-speakers were more proficient in both handling the syllables and deleting final phonemes of words. The authors consider the fact that phonological awareness is one of the critical skills in the acquisition of reading in an alphabetic orthography, and also they have discussed the development of phonological awareness as a function of the characteristics of spoken language, orthography and literacy instruction.

Blaiklock (2004) conducted a longitudinal study examining the relationship between phonological awareness and reading for a group of children during their first two years at school. Children showed rhyme awareness before they began to read but were unable to perform a phoneme deletion task until after they had developed word-reading skills.

Thus, the former review, suggests that the researchers have utilized diversified set of tasks like rhyme recognition, word, non-word reading, syllable stripping, phoneme

deletion etc. and few others have used a series of tasks for assessing the meta-phonological skills. In the reports, many authors have considered monolingual and bilingual school going participants. There has been a consistent observation made by the researchers who have reported that there seems to be an advantage for children who are exposed to more than one language (i.e. bilinguals) as compared to their monolingual counterparts. They have reported a cross-linguistic transfer of skills from one language to the other. The researchers who have researched on alphabetic script have concluded that rhyme recognition/awareness is the earliest predictor of reading abilities. On the other hand children exposed to a non-alphabetic script like that of Kannada, researchers have found that syllable awareness appears to be the key predictor for reading ability.

In brief, the research reports on the development of meta-phonological abilities suggest that rhyming and syllable awareness are the earliest of the skills which are learnt and mastered. It has been observed from the studies that there appears to be a clear advantage across the meta-phonological and reading skills in children exposed to more than one language. These skills also operate as an early predictor of reading different types of scripts like alphabetic script (e.g. English), non-alphabetic script (e.g. Kannada). However, there appears a divergence about what the type of awareness/skill which operates as a significant predictor for reading amongst the different types of scripts.

### **Cognitive/meta-cognitive measures**

Cognitive strategies are used to help an individual achieve a particular goal (e.g. understanding a text) where as meta-cognitive strategies are used to ensure that the goal has been reached (e.g. monitoring one's understanding of that text). Meta-cognitive

awareness is a higher level skill which requires the ability to reflect upon how the primary skills of decoding and comprehension are being used.

Jorm, Share, Mac Lean and Matthews (1984) and Hulme (1988) found a correlation between memory spans and reading comprehension. They reported that short term memory skills may be important for the development of comprehension skills. However, according to other researchers like Oakhill, Yuill and Parkin, 1986; Stothard and Hulme, 1992, it does not appear that impaired memory skills are a frequent cause of specific reading comprehension difficulties.

Paris, Wasik and Vander Westhuzin (1988) reported evidence for variation in meta-cognitive awareness as related to variations in reading abilities.

De Jong and Van der Leij, (2003) and Vellutino, Fletcher, Snowling, and Scanlon (2004) reported that there is a significant relationship with basic reading skills established for other phonological processing skills such as phonological short-term memory and rate of access to phonological information in long-term memory.

Mannai and Everatt (2005) reported a study of the reading and spelling skills of children from grade I to grade III Arabic-speaking children in Bahrain, the participants were on their literacy skills using single word reading and spelling, their ability to decode letter strings (non-word reading) and measures of phonological awareness, short-term memory, speed of processing and non-verbal ability. The authors reported that the results were consistent with the previous research work based on tests of English-speaking

children in that measures of phonological skills (decoding and awareness) were the best predictors of variability in reading and spelling among the Bahraini children. Also, the results have its efficacy in terms of the literacy experiences of the children and the use of short vowels in Arabic writing.

Gindri, Keske-Soares and Mota (2007) examined the relationship between working memory, phonological awareness and spelling hypothesis in pre-school and grade I children. 40 preschoolers and 50 grade I children participated in the study. They used the Auditory Sequential Test, subtest of Illinois Test of Psycholinguistic Abilities (ITPA) and the Meaningless Words Memory Test for examining the phonological loop because they based their study on the Baddeley's model. The phonological awareness abilities were investigated using the Phonological Awareness: Instrument of Sequential Assessment involving syllabic and phonemic awareness tasks. Their results revealed that first graders could perform better, repeating more number of sequences. They concluded that the performance of working memory, phonological awareness and spelling level were inter-related, as well as being related to chronological age, development and scholarship.

Ramachandra and Karanth (2007) addressed the issue of meta-linguistic skills being a product of cognitive development or as a product of literacy instruction. They conducted an experiment on a group of pre-school children and a group of non-literate adults, in Kannada, to investigate their understanding of the relationship between written language and oral language in particular their understanding of the relationship between

the 'word' and its 'referent' and the effect of literacy acquisition on the same. Their results support the view that acquisition of literacy has a significant influence on an individual's conception of words, though an interaction between cognitive maturation and literacy exposure cannot be ruled out.

There lies a close relation between language and cognition, this relation receives evidences from various theoretical and empirical viewpoints. The most commonly and widely accepted and documented theoretical framework has been derived from the psycholinguistic models such as Levelt's modular model of language production, Levelt (as cited in Cook, 1997). This model states that monolinguals have a disadvantage over bilinguals which are in the form of subtractive effects. As a result the monolinguals may have a deficiency with respect to the processing of both L1 and L2 due to these subtractive effects. On the other hand, the bilinguals show an additive effect for processing of L1 and L2. These additive effects may be in terms of enhancement of meta-linguistic skills, arbitrariness of the word and other cognitive processes like divergent thinking, creativity, more diversified set of mental abilities, measures of conceptual development and analogical reasoning. This reflects the better performances of bilinguals on cognitive domains. Further, the bilinguals will also show a better and clearer representation of concepts. This issue of conceptualization in bilinguals has been well advocated by Poulisse and Bongaerts (1994), De Bot et.al (as cited in Cook, 1997). According to Bialystok (2007), there are three aspects which contribute in strengthening the literacy skills in bilinguals. They include verbal proficiency, representational concepts

of writing, meta-cognitive processes and strategies for reading. Further the researcher has also stated that bilingualism enhances the meta-linguistic insights.

Hence, the research suggests that the factors like working and short term memory, cognitive maturation, speed of processing, and memory spans have an impact on meta-phonological and literacy skills. These factors, according to the researchers cannot be disregarded.

## CHAPTER 3

### METHOD

The current study was conducted to investigate the pattern of development and also the different factors affecting meta-phonological and reading skills in monolingual (Kannada) and bilingual (Kannada and English) children, in the age range of 8-9 years.

### PARTICIPANTS

A total of 60 participants were included in the study. These participants were divided in two groups:

**Group- I:**

30 (15 females and 15 males) school going children, with mother-tongue and exposure to Kannada (L1) only. (Monolingual).

• **Group- II:**

30 (15 females and 15 males) school going children with mother-tongue and exposure to Kannada (L1) and exposure to English as L2. (Bilingual).

Kannada is one of the major Dravidian languages of India, spoken predominantly in the state of Karnataka. It has 50 basic letter symbols which are arranged in phonetic manner. This script has a high grapho-phoneme correspondence resulting in the absence of irregular spellings excepting 'Arka' and 'Anuswara' which function as phonemes with independent graphemic status. Also because homonyms in Kannada are both homophones and homographs, homophone-homograph dissociation does not exist.



Hence it is called a syllabi alphabetic script. This semi-syllabic system has special features of syllabic and alphabetic scripts (e.g. like that of English) with specific diacritic marks to denote phoneme changes and the presence of distinct graphemes to represent the allomorphs.

**AGE RANGE:**

- 8.0 - 9.0 years

**Ethical Standards used in the study for the selection of participants**

Participants were selected by adhering to the appropriate ethical procedures. Participants and/or parents were explained the purpose and procedures of the study, and an informed verbal and/or written consent were taken. They were randomly selected based on the inclusionary criteria/s.

**Inclusionary Criteria**

Participants were screened to rule out:

- Signs and symptoms of learning disability.
- Academic failures (based on teacher's report).
- Language deficits, delayed speech and language milestones, history of any ear pathology, emotional, behavioral and/or neurological deficits.
- Participants were from middle socio-economic status.

**Tools**

- Reading Acquisition Profile -Kannada (RAP-K) test, (Prema, 1997).

- Purpose:
  - To assess the meta-phonological and reading skills.

The following sub-sections of the test were used in the current study:

**a. Meta-phonological Test**

- i. Rhyme recognition.
- ii. Syllable stripping.
- iii. Syllable oddity (words).
- iv. Syllable oddity (non-words).
- v. Phoneme stripping.
- vi. Phoneme oddity.

**b. Reading Test**

- i. Syllable inventory [consonant-vowel (CV), consonant-consonant-vowel (CCV), and consonant-consonant-consonant-vowel (CCCV)].
- ii. Words and non-words.
- iii. Geminates – words and non-words.
- iv. Polysyllabic – words and non-words.
- v. Arka – words and non-words.
- vi. Anuswara– words and non-words.

### Data collection (Measures and Materials)

Testing was conducted in a quite surrounding (room set up). The test was administered individually with minimal distractors around. Table-1 shows the tests administered on the two groups with their purposes.

*Table 1*

*Tests administered and the purpose of the tests for the two groups*

| <b>Groups</b>             | <b>Tests</b>   | <b>Purpose</b>                                      |
|---------------------------|--|---|
| Group-I<br>(Monolinguals) | Meta-phonological and reading tests (sub-sections of Reading Acquisition Profile Kannada (RAP-K) test. | To assess the meta-phonological and reading skills. |
| Group-II<br>(Bilinguals)  | Meta-phonological and reading tests (sub-sections of Reading Acquisition Profile Kannada (RAP-K) test. | To assess the meta-phonological and reading skills. |

## Instructions to the participants

- **Meta-phonological test**

- i. Rhyme recognition

The pairs of words were presented orally to the children. They were asked to identify whether the paired words were rhyming or not.

- ii. Syllable stripping

The children were presented with 12 CVCVCV types of words verbally. They were asked to strip (delete) a syllable indicated by the tester and say the rest of the word. (E.g. In the word muDuka, the children were asked to delete /ka/ and say the rest of the word).

- iii. Syllable oddity (words)

12 sets of words of four CVCVCV type were presented verbally. They were asked to identify the particular word that did not belong to the set. Specific instruction was given to listen to the sound aspect of the word rather than paying attention to the meaning. (E.g. caraTa, camaca, catura, seragu).

- iv. Syllable oddity (non-words)

12 sets of words of four CVCVCV type were presented verbally. They were asked to identify the particular word that did not belong to the set. Specific instruction was given to listen to the sound aspect of the word rather than paying attention to the meaning. (E.g. gariko, gapuci, tadheTi, ganeto).

v. Phoneme stripping

12 disyllabic words of CVCV configuration were presented verbally to the children. They were asked to listen to the words and strip (delete) a small part of the word and say the rest (E.g. in the word *sapta*, to delete /t/ and say the rest of the word).

vi. Phoneme oddity

12 sets of four non-words each with CVCV configuration were presented verbally to the children. They were asked to listen to the non-words and choose the one that did not belong to the set (E.g. *Tuka*, *jine*, *Tale*, *Tigu*).

- **Reading test**

The syllable and word/non-word lists were clearly written on a sheet of paper with adequate spacing. All the children were individually administered the reading test. They were asked to read the test words and non-words loudly. The responses were noted precisely. The responses were scored for accuracy and the errors were analyzed qualitatively.

## **SCORING**

The scores were allotted based on the performance of the participants in the two groups.

- In the meta-phonological test

All the sub-sections' maximum score is 12 and participants received a score of 1 for every correct response.

- In the reading test
  - The maximum score for syllable inventory
  - i. Maximum score for consonant-vowel (CV)=40
  - ii. Maximum score for consonant-consonant-vowel (CCV)=10
  - iii. Maximum score for consonant-consonant-consonant-vowel (CCCV) =10
    - The maximum score for words = 20
    - The maximum score for non-words=20
    - The maximum score for geminate words =10
    - The maximum score for geminate non-words =10
    - The maximum score for polysyllabic words =20
    - The maximum score for polysyllabic non-words=20
    - The maximum score for arka words=10
    - The maximum score for arka non-words=10
    - The maximum score for anuswara words=10
    - The maximum score for anuswara non-words=10

The scoring for sub-tests were done according to the instructions given in the test manual; for the reading tasks, each correctly read word was marked with a tick mark. Then they were scored depending on the word correctly being read or not. Each correctly read word was given a score of 1.

## **Statistical Analysis**

The obtained data were appropriately tabulated and subjected to statistical measures. SPSS software (version 16.0.) package was used for statistical analysis. The tabulated scores were used for obtaining the mean (M) and standard deviation (SD). Parametric tests were utilized to obtain the significant difference measures. MANOVA was used to compare the performance of female and male participants across the various meta-phonological and reading tasks for both the groups. Repeated measures ANOVA were used to obtain the significant difference scores between the two groups across the various meta-phonological and reading tasks. The data was further subjected to Bonferroni test to find out significant difference within each group, if any.

## CHAPTER 4

### RESULTS AND DISCUSSION

The main aim of the current study was to investigate the pattern of meta-phonological and reading skills and the various factors influencing the same in monolingual (Kannada) and bilingual (Kannada and English) children, in the age range of 8-9 years.

The study included two groups of participants:

- Monolingual children
- Bilingual children

The various meta-phonological and reading tasks of the Reading Acquisition Profile-Kannada (RAP-K) test (Prema, 1997) were used. The data collected was tabulated and subjected to statistical measures. SPSS software (version16.0.) package was used to compare the performances of female and male participants across the two groups.

The raw data was converted to percentage scores for each task and the differences in the performances were calculated for the two groups. These differences, if any were then subjected to statistical analysis for calculation of mean (M) and standard deviation (SD). The differences in results were compared within and across tasks, between the groups.



The outcomes are discussed with respect to the tasks listed below:

- Meta-phonological Tasks
- Reading Tasks

The findings of the present study have been broadly presented under the following headings:

- I. Quantitative analysis of gender differences across the two tasks.
- II. Quantitative analysis of the two tasks across the two groups.
- III. Qualitative analysis of the performances of the two groups across the tasks.

#### **I. Quantitative analysis of gender differences across the two tasks**

The mean scores were analyzed and the measures were subjected to quantitative statistical analysis. The following comparisons were made using multiple analysis of variance (MANOVA).

- a. Comparison of the performance of female and male participants in the monolingual and bilingual groups across the meta-phonological tasks.
- b. Comparison of the performance of female and male participants in the monolingual and bilingual groups across the reading tasks.

**I. (a) Comparison of the performance of female and male participants in the monolingual and bilingual groups across the meta-phonological tasks**

The overall total scores were summed up for all the tasks. For all the dependent variables i.e. the meta-phonological tasks [rhyme recognition (RR), syllable stripping (SS), syllable oddity for words (SOW), syllable oddity for non-words (SONW), phoneme stripping (PS) and phoneme oddity (PO)], the mean (M) and standard deviation (SD) were calculated. Table-2 illustrates the mean and SD values for female and male participants of the two groups across the meta-phonological tasks.

*Table 2  
Mean and SD values for female and male participants of the two groups across the meta-phonological tasks*

| Tasks | Groups      | Females |      | Males |      | Total |      |
|-------|-------------|---------|------|-------|------|-------|------|
|       |             | Mean    | SD   | Mean  | SD   | Mean  | SD   |
| RR    | Monolingual | 11.73   | 0.79 | 11.80 | 0.56 | 11.76 | 0.67 |
|       | Bilingual   | 12.00   | 0.00 | 11.93 | 0.25 | 11.96 | 0.18 |
| SS    | Monolingual | 11.13   | 0.99 | 11.73 | 0.79 | 11.43 | 0.93 |
|       | Bilingual   | 11.86   | 0.35 | 11.60 | 0.82 | 11.73 | 0.63 |
| SOW   | Monolingual | 7.73    | 1.22 | 8.46  | 1.68 | 8.10  | 1.49 |
|       | Bilingual   | 9.46    | 1.18 | 10.00 | 1.46 | 9.73  | 1.33 |
| SONW  | Monolingual | 7.46    | 1.30 | 7.80  | 1.93 | 7.63  | 1.62 |
|       | Bilingual   | 9.33    | 1.23 | 9.33  | 1.39 | 9.33  | 1.29 |
| PS    | Monolingual | 7.80    | 1.42 | 7.73  | 1.38 | 7.76  | 1.38 |
|       | Bilingual   | 9.13    | 1.50 | 8.53  | 1.18 | 8.83  | 1.36 |
| PO    | Monolingual | 5.46    | 1.06 | 6.13  | 1.64 | 5.80  | 1.39 |
|       | Bilingual   | 7.33    | 1.23 | 7.93  | 1.53 | 7.63  | 1.40 |
| Total | Monolingual | 51.33   | 5.21 | 53.66 | 6.56 | 52.50 | 5.94 |
|       | Bilingual   | 59.13   | 3.94 | 59.33 | 5.39 | 59.23 | 4.64 |

The performances of female and male participants in the monolingual and bilingual groups across the meta-phonological tasks are discussed with reference to:

- Rhyme recognition (RR)
- Syllable stripping (SS)
- Syllable oddity for words (SOW)
- Syllable oddity for non-words (SONW)
- Phoneme stripping (PS)
- Phoneme Oddity (PO)

### **Rhyme recognition (RR)**

The female and male participants in the monolingual group across the rhyme recognition (RR) task scored a mean of 11.733 (SD =0.79) and 11.80 (SD=0.56) respectively. The total mean score of monolingual for RR task was 11.76 (SD=0.67). The female and male participants in the bilingual group obtained a mean score of 12.00, 11.93 (SD=0.25) respectively. The total mean values of the bilingual group for RR task was 11.96 (SD=0.18).

### **Syllable stripping (SS)**

The female participants in the monolingual group across the syllable stripping (SS) task scored a mean of 11.13 (SD =0.99), while the male participants obtained a mean score of 11.73 (SD=0.79). The monolingual participants obtained a total score of 11.43 (SD=0.93) for SS task. The female participants in the bilingual group got a mean

score of 11.86 (SD =0.35), on the other hand the male participants got a mean score of 11.60 (SD=0.82). 11.73 (SD=0.63) was the total mean score obtained by the bilingual group for SS task.

### **Syllable oddity for words (SOW)**

7.73 (SD =1.22) and 8.46 (SD=1.68) were the mean scores shown by female and male participants in the monolingual group respectively across the syllable oddity for words (SOW) task. The total mean values in the monolingual group for SOW task was 8.10 (SD=1.49). The female participants in the bilingual group had a mean score of 9.46 (SD =1.18) while for male participants the mean value was 10.00 (SD=1.46). The total mean score for the bilingual group across the SOW task was 9.73 (SD=1.33).

### **Syllable oddity for non-words (SONW)**

The female and male participants of the monolingual group across the syllable oddity for non- words (SONW) task got a mean of 7.46 (SD =1.30) and 7.80 (SD=1.93) respectively. In the SONW task the total mean score for the monolingual group was 7.63 (SD=1.62). The female participants in the bilingual group got a mean score of 9.33 (SD =1.23); male participants got a mean score of 9.33 (SD=1.39). The total mean score of the bilingual group for SONW task was 9.33 (SD=1.29).

### **Phoneme stripping (PS)**

The female and male participants of the monolingual group across the phoneme stripping (PS) task got a mean of 7.80 (SD =1.42) and 7.73 (SD=1.38) respectively. The monolingual group obtained a total mean score of 7.76 (SD=1.38). On the other hand

female and male participants in the bilingual group got a mean score 9.13 (SD =1.50) and 8.53 (SD=1.18) respectively, their total mean score was 8.83 (SD=1.36) across the PS task.

### **Phoneme oddity (PO)**

A score of 5.46 (SD =1.06) and 6.13 (SD=1.64) was obtained by female and male participants of the monolingual group and they obtained a total mean score of 5.80 (SD=1.39) for the PO task. Parallel to this the female and male participants in the bilingual group obtained a mean score of 7.33 (SD =1.23) and 7.93 (SD=1.53) across PO task. This group showed a total mean score of 7.63 with SD of 1.40.

The female and male participants in the monolingual group pulled up an overall total mean score of 51.33 (SD=5.21) and 53.66 (SD=6.56) respectively. Hence, the overall total mean scores for this group was 52.50 (SD=5.94). 59.13(SD=3.94) and 59.33 (SD=5.39) were the scores revealed by female and male participants of the bilingual group. They secured an overall total mean score of 59.23 with a SD of 4.64.

The mean scores put forth clearly show that both female and male participants of the two groups performed equally well on the meta-phonological tasks.

However, the Bonferroni test was carried out to find out the gender-difference between the two groups. The scores were not statistically significant at  $p < 0.05$  when comparison was drawn for the performance of the female and male participants in both groups on meta-phonological tasks.

**I. (b) Comparison of the performance of female and male participants in the monolingual and bilingual groups across the reading tasks**

The overall total scores were summed up for all the tasks. For all the dependent variables i.e. the reading tasks [consonant-vowel (CV), consonant-consonant-vowel (CCV), consonant-consonant-consonant-vowel (CCCV), words (W), non-words (NW), geminates words (GW), geminates non-words (GNW), polysyllabic words (PW), polysyllabic non-words (PNW), arka words (ARW), arka non-words (ARNW), anuswara words (AW) and anuswara non-words (ANW)], mean (M) and SD were calculated. Table-3 shows the mean and SD values of female and male participants of the two groups across the reading tasks.

The performances of female and male participants in both the groups across the reading tasks are conferred with respect to:

**Consonant-vowel (CV)**

The scores obtained by both the groups are illustrated on table-3. The female participants of the monolingual group across the consonant-vowel (CV) task got a mean of 36.60 (SD=2.58) where as male participants secured a mean value of 35.66 (SD=3.57). The total mean score for the monolingual group for CV task was 36.13 (SD=3.10).

Table 3

*Mean and SD values of female and male participants of the two groups across the reading tasks*

|       |             | Females |       | Males  |       | Total  |       |
|-------|-------------|---------|-------|--------|-------|--------|-------|
| Tasks | Groups      | Mean    | SD    | Mean   | SD    | Mean   | SD    |
| CV    | Monolingual | 36.60   | 2.58  | 35.66  | 3.57  | 36.13  | 3.10  |
|       | Bilingual   | 36.33   | 2.19  | 36.73  | 2.65  | 36.53  | 2.40  |
| CCV   | Monolingual | 7.53    | 1.30  | 6.93   | 1.43  | 7.23   | 1.38  |
|       | Bilingual   | 7.80    | 1.14  | 8.20   | 1.08  | 8.00   | 1.11  |
| CCCV  | Monolingual | 6.13    | 1.68  | 6.20   | 1.74  | 6.16   | 1.68  |
|       | Bilingual   | 6.66    | 0.81  | 7.06   | 1.22  | 6.86   | 1.04  |
| W     | Monolingual | 18.66   | 1.23  | 18.53  | 1.59  | 18.60  | 1.40  |
|       | Bilingual   | 19.06   | 1.03  | 18.80  | 1.47  | 18.93  | 1.25  |
| NW    | Monolingual | 17.60   | 1.54  | 17.73  | 1.66  | 17.66  | 1.58  |
|       | Bilingual   | 18.66   | 0.97  | 18.53  | 1.40  | 18.60  | 1.19  |
| GW    | Monolingual | 9.20    | 1.01  | 8.73   | 1.53  | 8.96   | 1.29  |
|       | Bilingual   | 9.33    | 0.72  | 9.13   | 1.06  | 9.23   | 0.89  |
| GNW   | Monolingual | 8.40    | 1.12  | 8.20   | 1.65  | 8.30   | 1.39  |
|       | Bilingual   | 8.66    | 1.11  | 8.53   | 1.35  | 8.60   | 1.22  |
| PW    | Monolingual | 17.33   | 1.95  | 16.80  | 1.97  | 17.06  | 1.94  |
|       | Bilingual   | 17.46   | 1.59  | 17.33  | 2.79  | 17.40  | 2.23  |
| PNW   | Monolingual | 16.93   | 2.25  | 16.53  | 3.41  | 16.73  | 2.85  |
|       | Bilingual   | 17.46   | 1.76  | 17.06  | 2.60  | 17.26  | 2.19  |
| ARW   | Monolingual | 7.66    | 1.79  | 6.73   | 2.37  | 7.20   | 2.12  |
|       | Bilingual   | 7.46    | 1.18  | 8.13   | 1.45  | 7.80   | 1.34  |
| ARNW  | Monolingual | 5.86    | 1.95  | 5.60   | 3.08  | 5.73   | 2.54  |
|       | Bilingual   | 6.40    | 1.63  | 7.13   | 1.68  | 6.76   | 1.67  |
| AW    | Monolingual | 7.00    | 1.85  | 6.40   | 2.97  | 6.70   | 2.45  |
|       | Bilingual   | 8.00    | 1.46  | 8.20   | 1.61  | 8.10   | 1.51  |
| ANW   | Monolingual | 8.00    | 2.59  | 7.20   | 3.12  | 7.60   | 2.84  |
|       | Bilingual   | 9.20    | 1.20  | 8.66   | 1.87  | 8.93   | 1.57  |
| Total | Monolingual | 166.93  | 18.11 | 161.26 | 25.99 | 164.10 | 22.20 |
|       | Bilingual   | 172.53  | 14.33 | 173.53 | 19.73 | 173.03 | 16.95 |

The female and male participants in the bilingual group obtained a mean score of 36.33 (SD =2.193) and 36.73 (SD=2.65) respectively. The total mean score for the bilingual group for CV task was 36.53 (SD=2.40).

### **Consonant-consonant-vowel (CCV)**

The female participants of the monolingual group across the consonant-consonant-vowel (CCV) task got a mean of 7.53 (SD=1.30), like-wise male participants got a mean score of 6.93 (SD=1.43). Their total mean score for CCV task being 7.23 (SD=1.38). 7.80 (SD =1.14) and 8.20 (SD=1.08) were the scores secured by the female and male participants in the bilingual group. The total mean score for the bilingual group across the CCV task was 8.00 (SD=1.11).

### **Consonant-consonant- consonant-vowel (CCCV)**

The female participants of the monolingual group across the consonant-consonant-consonant-vowel (CCCV) task got a mean of 6.13 (SD=1.68), similarly male participants got a mean score of 6.20 (SD=1.74). The total mean scores obtained by the monolingual group for CCCV task was 6.16 (SD=1.68). 6.66 (SD=0.81) and 7.06 (SD=1.22) were the scores shown by the female and male participants in the bilingual group. They obtained a total mean score of 6.86 (SD=1.04) across the CCCV task.

### **Words (W)**

For words (W) task the female participants of the monolingual group got a mean of 18.66 (SD=1.23) and male participants secured a mean score of 18.53 (SD=1.59). Their total mean score for word (W) task was 18.60 (SD=1.40). The female and male



participants in the bilingual group showed a mean score of 19.06 (SD =1.03) and 18.80 (SD=1.03) respectively. The total mean score for the bilingual group was 18.93 (SD=1.25) for this task.

### **Non-words (NW)**

The female participants of the monolingual group across the non-word (NW) task obtained a mean of 17.60 (SD=1.54) similarly the male participants illustrated a mean score of 17.73 (SD=1.66). This group secured a total mean score of 17.66 (SD=1.58) for NW task. On the other hand the female and male participants in the bilingual group obtained a mean score of 18.66 (SD =0.97) and 18.53 (SD=1.40) respectively. The bilingual group obtained a total mean score of 18.60 (SD=1.19) across the NW task.

### **Geminate words (GW)**

8.73 (SD=1.53) and 9.20 (SD=1.01) were the mean scores shown by the female and male participants of the monolingual group across the geminate-words (GW). This group received a total mean score of 8.96 (SD=1.29) in GW task. Alternatively the female participants in the bilingual group got a mean score of 9.33 (SD =0.72); male participants got a mean score of 9.13 (SD=1.06). The total mean score obtained by the bilingual group for GW task was 9.23 (SD=0.89).

### **Geminate non-words (GNW)**

The female participants of the monolingual group across the geminate non-words (GNW) task got a mean score of 8.40 (SD=1.12) like-wise male participants got a mean score of 8.20 (SD=1.65). On the GNW task, the monolingual group secured a total mean

score of 8.30 (SD=1.39); where as the female and male participants in the bilingual group obtained a mean score of 8.66 (SD =1.11) and 8.53 (SD=1.35) respectively. They obtained a total mean score of 8.60 (SD=1.22).

### **Polysyllabic words (PW)**

The female participants of the monolingual group across the polysyllabic words (PW) task got a mean score of 17.33 (SD=1.95), male participants got a mean score of 16.80 (SD=1.97). The total mean score for the monolingual group in PW task was 17.06 (SD=1.94). The female participants in the bilingual group got a mean score of 17.46 (SD =1.59); male participants got a mean score of 17.33 (SD=2.79). The total mean score (bilingual) for PW task was 17.40 (SD=2.23).

### **Polysyllabic non-words (PNW)**

In the monolingual group the female and male participants scored a mean of 16.93 (SD=2.25) and 16.53 (SD=3.41) across the PNW task. They obtained a total mean score of 16.73 with SD=2.85, where as in the bilingual group, the female participants obtained a mean value of 17.46 (SD =1.76); male participants got a mean score of 17.06 (SD=2.60). The total mean value summed up to 17.26 with SD=2.19 across the PNW task.

### **Arka words (ARW)**

The female participants secured a mean score of 7.66 with SD=1.79, parallel to this male participants obtained a mean score of 6.73 with SD=2.37 in the monolingual group for ARW task. Their total mean score for ARW task was 7.20 (SD=2.12). In the

bilingual group female participants secured a mean score of 7.46 with SD =1.18, on the other hand male participants got a mean score of 8.13 (SD=1.45). They obtained a total mean score of 7.80 (SD=1.34) for the ARW task.

### **Arka non-words (ARNW)**

The female and male participants in the monolingual group across the ARNW task got a mean score of 5.86 (SD=1.95) and 5.60 (SD=3.08) correspondingly. They secured a total mean score of 5.73 with SD=2.54. On the other hand the female participants in the bilingual group obtained a mean score of 6.40 with SD=1.63, alternatively male participants secured a mean score of 7.13 (SD=1.68). The bilingual group obtained a total mean value of 6.76 (SD=1.67) for ARNW task.

### **Anuswara words (AW)**

7.00 (SD=1.85) and 6.40 (SD=2.97) were the mean values secured by the female and male participants in the monolingual group across the AW task. They showed a total mean score of 6.70 with SD=2.45. Alternatively female participants in the bilingual group obtained a mean score of 8.00 (SD =1.46); male participants got a mean score of 8.20 (SD=1.61). The total mean score summed up to 8.1000(SD=1.51) for AW task.

### **Anuswara non-words (ANW)**

The female participants of the monolingual group across the ANW task achieved a mean score of 8.00 (SD=2.59); male participants obtained a mean score of 7.20 (SD=3.12). Their total mean score for ANW task was 7.60 with SD=2.84. Alternatively the female participants in the bilingual group obtained a mean score of 9.20 (SD =1.20);

male participants secured a mean score of 8.66 with SD=1.87. Their total mean value summed up to 8.93 (SD=1.57) for ANW task.

The overall mean values for female and male participants in the monolingual group was 166.93 (SD=18.11) and 161.26 (SD=25.99) respectively. The overall total mean score for this group was 164.10 (SD=22.20). The female participants in the bilingual group obtained an overall mean value of 172.53 (SD=14.33); where as male participants secured a score of 173.53 with SD=19.73. The overall total mean score for this group was 173.03 (SD=16.95).

Table-3 apparently shows that both female and male participants of the two groups performed equally well on the reading tasks.

Later the Bonferroni test was carried out to find out the difference between the groups. The scores were not statistically significant at  $p < 0.05$  between the performance of the female and male participants in both groups on reading tasks.

Thus, it is evident from the results that there were subtle differences in the mean values in female participants [51.33 (SD=5.21), 166.93 (SD=18.11) in the monolingual group; 59.13 (SD=3.94), 172.53 (SD=14.33) in the bilingual group] and male participants [53.66 with SD=6.56, 161.26 (SD=25.99) in the monolingual group; 59.33(SD=5.39), 173.53 (SD=19.73) in the bilingual group] for the meta-phonological and reading tasks respectively. This leads to the contemplation that both female and male participants were equally competent in learning the meta-phonological skills and reading skills in the age range of 8-9 years. This could be attributable to fact that the variables like language learning environment, literacy instruction, socio-economic status, age, nurturing, parent

scaffolding, may not be an influential factor across females and males. Thus these factors do enhance learning skills equally across gender.

In support with the literature, there seems to be no gender-differences across the two tasks and the two groups. This is in accord with the research work done by Burt, Holm and Dodd (1999) who reported that females and males performed equally well on the meta-phonological tasks. However, the socio-economic status (SES) affected the performances on majority of the tasks. Further the older children exhibited better phonological awareness in contrast to younger peers.

The present study also showed similar findings where female and male participants performed like-wise on the meta-phonological tasks. This result is supported by the findings of Dodd and Carr (2003). Evidence also comes from the research work by McDowell, Lonigan, Goldstein (2007) who reported that age, speech sound accuracy, and vocabulary each contributed unique variance to the prediction of phonological awareness in both females and males.

However, the results of the current study contraindicated the results by Moura, Mezzomo and Cielo (2009) in which they reported that on the phonemic segmentation of words with six phonemes and phoneme reversion of words with two or three phonemes, female participants performed better than male participants. However, this suggests that the phonological awareness stimulation program might have lead to better learning of specific skills like segmentation, reversion. Yet such a learning experience might not be generalized to other skills like stripping, oddity.

Hence, the factors like acquisition, application and use of meta-phonological and reading skills for scholastic purposes appears to show equal effectiveness amongst females and males.

Better mean scores [11.76 (SD =0.67) in the monolingual group and 11.96 (SD=0.18) bilingual in group] were seen for rhyme recognition (RR) and [11.43 SD=0.93 in the monolingual group and 11.73 with SD=0.63] on syllable stripping (SS) tasks, followed by syllable oddity tasks [8.10 SD=1.49 in the monolingual group and 9.73 SD=1.33 in the bilingual group for SOW task, 7.63 SD=1.62 in the monolingual group and 9.33 SD=1.29 in the bilingual group for the SONW task] lastly the phoneme stripping [7.76 SD=1.38 in the monolingual group and 8.83 SD=1.36 in the bilingual group for PS task] and phoneme oddity [5.80 SD=1.39 in the monolingual group and 7.63 with SD=1.40] tasks. The better performances on the tasks may reflect on the skills which are acquired and mastered earlier on as contrasted to other tasks. This also shows that rhyme recognition and syllable stripping tasks requires less cognitive load in comparison to phoneme stripping and syllable, phoneme oddity tasks. Further, it might be speculated that rhyme recognition task involves a binary choice where there is possibility of guess work, hence resulting in better performances.

On the other hand looking into the mean scores the female and male participants in the bilingual group performed slightly better than the monolingual group (59.13 SD=3.94, & 59.33 SD=5.39 respectively). This observation is supported by the research work done by Bruck and Genesee (1995) where in their results indicated that the bilingual group obtained higher scores on the syllable segmentation and that might reflect on the role of second language input on phonological awareness. This finding is also

supported by the study done by Liberman et.al (1980) in which they reported that syllable tasks are easy as the segmenting of words into syllables is easier than phonemes. Goswami and Bryant (1990) and Goswami (1991) reported that rhyme recognition is the earliest predictor of reading ability in an alphabetic script. Prakash and Chandrika (as cited in Prema, 1997) reported that syllable stripping is the earliest predictor for non-alphabetic script. Similar finding is observed in the current study suggesting that rhyme awareness in Kannada is more associated with syllable awareness than phonological awareness.

In view of the results of this comparison of the mean percentage scores on the meta-phonological and reading tasks the following can be summarized:

- There was no significant difference between the performances of female and male participants across the two tasks in two groups (monolingual and bilingual).
- There are research reports which suggest that there are no differences between female and male participants on meta-phonological and reading tasks.
- Factors like language learning environment, SES, literacy instruction parental scaffolding, nurturing, etc... is independent of gender variable in the age range of 8-9 years for meta-phonological and reading tasks.
- Results clearly reveal that there is a developmental trend in the acquisition of meta-phonological skills. This shows that there is a clear-cut trend in the acquisition of meta-phonological skills. Rhyme

and syllable awareness appears to be the earliest skills to be developed followed by phoneme awareness.

- The finding does indicate that the cognitive load equally influences the acquisition of meta-phonological and reading skills.
- Reports also substantiate the fact that female participants perform better on meta-phonological awareness and reading tasks.

## **II. Quantitative analysis of the two tasks across the two groups**

Since the performance of female and male participants were not significantly different across the tasks, (meta-phonological and reading), gender-wise pooling of the data was done and subjected to statistical analysis. The following comparisons were made using repeated measures analysis of variance:

- a. Comparison of the performance of monolingual and bilingual group across the meta-phonological tasks.
- b. Comparison of the performance of monolingual and bilingual group across the reading tasks.

### **II. (a) Comparison of the performance of monolingual and bilingual group across the meta-phonological tasks**

The mean percentage values of the monolingual and bilingual group were compared across the meta-phonological tasks. The mean (M) and standard deviation (SD) were calculated for rhyme recognition (RR), syllable stripping (SS), syllable oddity for words (SOW), syllable oddity for non-words (SONW), phoneme stripping (PS) and phoneme



oddity (PO) tasks. These mean and SD values of the meta-phonological tasks for the groups are presented in table-4

*Table 4*

*Mean and SD for the total scores obtained by the groups on meta- phonological tasks*

| <b>Tasks</b> | <b>Monolinguals</b> |           | <b>Bilinguals</b> |           | <b>Total</b> |           |
|--------------|---------------------|-----------|-------------------|-----------|--------------|-----------|
|              | <b>Mean</b>         | <b>SD</b> | <b>Mean</b>       | <b>SD</b> | <b>Mean</b>  | <b>SD</b> |
| RR           | 98.05               | 5.65      | 99.72             | 1.52      | 98.88        | 4.19      |
| SS           | 95.27               | 7.79      | 97.77             | 5.33      | 96.52        | 6.73      |
| SOW          | 67.50               | 12.44     | 81.11             | 11.14     | 74.30        | 13.57     |
| SONW         | 63.61               | 13.57     | 77.77             | 10.79     | 70.69        | 14.10     |
| PS           | 64.72               | 11.51     | 73.61             | 11.38     | 69.16        | 12.20     |
| PO           | 48.33               | 11.66     | 63.61             | 11.67     | 55.97        | 13.90     |
| Total        | 72.91               | 8.25      | 82.26             | 6.44      | 77.59        | 8.72      |

### **Rhyme recognition (RR)**

On the RR task, the monolingual group scored a mean percentage of 98.05 (SD=5.65); the bilingual group scored a mean percentage of 99.72 (SD=1.52) and the total mean percentage was 98.88 (SD=4.19).

### **Syllable stripping (SS)**

In SS task, the monolingual group scored a mean percentage of 95.27 (SD=7.79) where as the bilingual group scored a mean percentage of 97.77 with SD=5.33. The total mean percentage was 96.52 (SD=6.73).

### **Syllable Oddity for words (SOW)**

The SOW task obtained a mean percentage of 67.50 (SD=12.44) in the monolingual group and the bilingual group scored a mean percentage of 81.11 (SD=11.14); the total mean percentage was 74.30 (SD=13.57).

### **Syllable Oddity for non-words (SONW)**

Similarly on the SONW task, the monolingual group scored a mean percentage value of 63.61 (SD=13.57), on the other hand the bilingual group scored a mean percentage of 77.77 with SD=10.79 and the total mean percentage was 70.69 (SD=14.10).

### **Phoneme stripping (PS)**

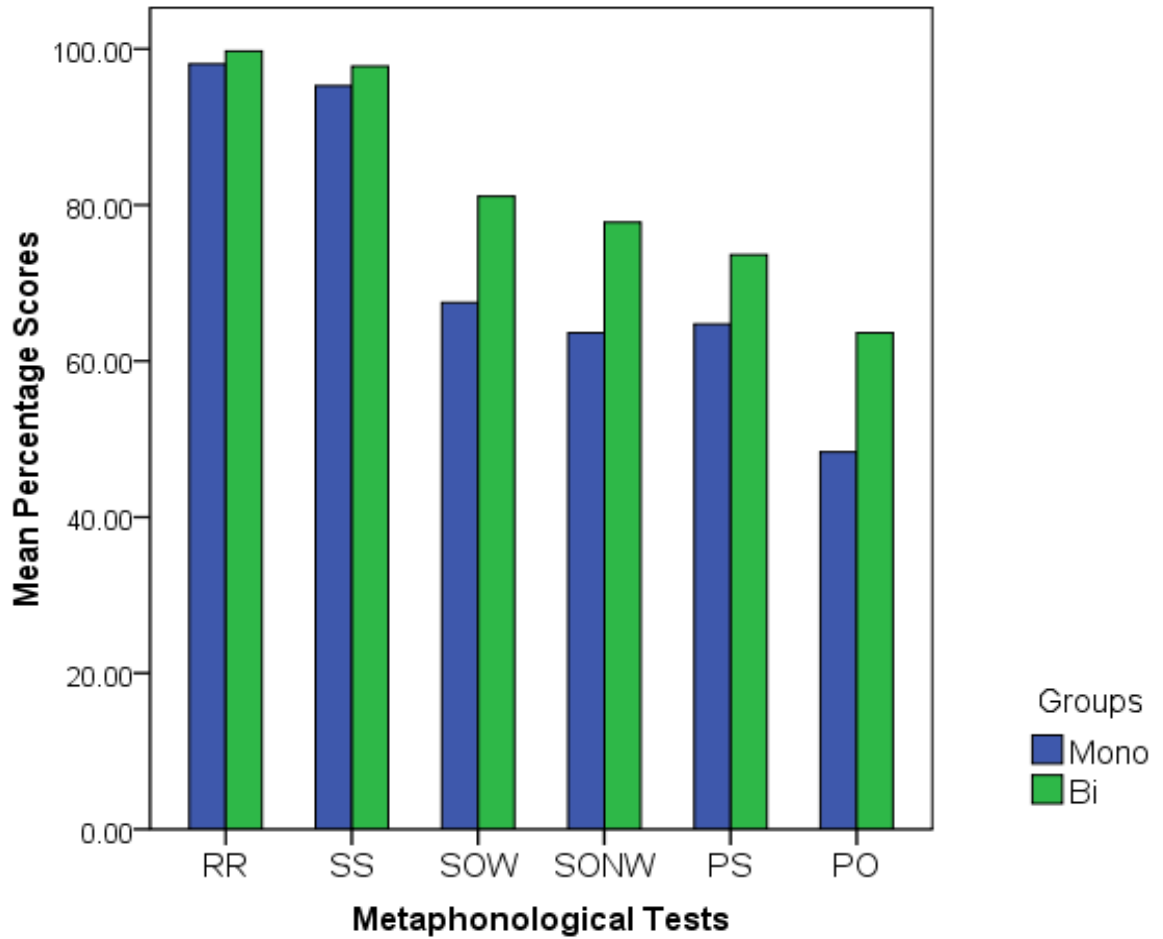
The monolingual and the bilingual group on the PS task, secured a mean percentage of 64.72 (SD=11.51) and 73.61 (SD=11.38) correspondingly. They obtained a total mean percentage of 69.16 with SD=12.20.

### **Phoneme Oddity (PO)**

The PO task showed a mean value of 48.33 (SD=11.66) and 63.61 with SD=11.67 in the monolingual and bilingual group respectively. The total mean percentage for both the groups was 55.97 (SD=13.90).

The overall total mean percentage scores across the tasks for the monolingual group was 72.91 (SD=8.25); and bilingual group obtained a total of 82.26 (SD=6.44). The overall total score for both the groups on the meta-phonological tasks was 77.59 (SD=8.72).

The mean percentage scores clearly exemplifies that the bilingual group performed better than the monolingual group. They showed better scores particularly on the SOW, SONW, PS and PO tasks. Later Bonferroni test was carried out to assess the overall difference between the two groups (monolingual and bilingual) in meta-phonological tasks. The results showed a statistically significant difference at {Mono= [F= (5,145) = 197.668, p < 0.05], Bi= [F= (5,145) = 103.093, p < 0.05]} on meta-phonological tasks in both the groups. The performances of the monolingual and bilingual groups across the meta-phonological tasks in percentage are depicted in the graph-1.



♦ *Graph 1.* Mean total scores of the monolingual and bilingual group across metaphonological tasks.

The performance of the participants as shown in graph-1 and table-4 where mean percentage scores are depicted, it is evident from the mean percentage values that monolingual and bilingual group performed equally on RR and SS tasks. However the

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♦ RR-rhyme recognition, SS-syllable stripping, SOW-syllable oddity for words, SONW- syllables oddity for non-words, PS-phoneme Stripping, PO-phoneme Oddity, Mono-monolinguals, and Bi-bilinguals.

mean percentage values differed for the SOW, SONW, PS and PO tasks for the two groups. It is evident from table-4 that the mean values of the bilingual group were better than the monolingual group. This significant difference at 0.05 levels was noticed for the total mean score values of the two groups, but not for the individual meta-phonological tasks.

## **II. (b) Comparison of the performance of monolingual and bilingual group across the reading tasks.**

The mean percentage values of the reading tasks for both the groups were compared. Table-5 illustrates the mean and SD values for the reading tasks in the monolingual and bilingual groups. The mean (M) and standard deviation (SD) were calculated for consonant-vowel (CV), consonant-consonant-vowel (CCV), consonant-consonant-consonant-vowel (CCCV), words(W), non-words (W), geminate words (GW), geminate non-words (GNW), polysyllabic words (PW), polysyllabic non-words (PNW), arka words (ARW), arka non-words (ARNW), anuswara words (AW), and anuswara non-words (ANW) tasks.

Table 5

Mean and SD for the total scores obtained by the groups on reading tasks

| Tasks | Monolinguals |       | Bilinguals |       | Total |       |
|-------|--------------|-------|------------|-------|-------|-------|
|       | Mean         | SD    | Mean       | SD    | Mean  | SD    |
| CV    | 90.33        | 7.76  | 91.33      | 6.00  | 90.83 | 6.89  |
| CCV   | 72.33        | 13.81 | 80.00      | 11.14 | 76.16 | 13.03 |
| CCCV  | 61.66        | 16.83 | 68.66      | 10.41 | 65.16 | 14.31 |
| W     | 93.00        | 7.02  | 94.66      | 6.28  | 93.83 | 6.66  |
| NW    | 88.33        | 7.91  | 93.00      | 5.95  | 90.66 | 7.33  |
| GW    | 89.66        | 12.99 | 92.33      | 8.97  | 91.00 | 11.15 |
| GNW   | 83.00        | 13.93 | 86.00      | 12.20 | 84.50 | 13.07 |
| PW    | 85.33        | 9.73  | 87.00      | 11.18 | 86.16 | 10.43 |
| PNW   | 83.66        | 14.25 | 86.33      | 10.98 | 85.00 | 12.68 |
| ARW   | 72.00        | 21.23 | 78.00      | 13.49 | 75.00 | 17.89 |
| ARNW  | 57.33        | 25.45 | 67.66      | 16.75 | 62.50 | 21.98 |
| AW    | 67.00        | 24.51 | 81.00      | 15.16 | 74.00 | 21.40 |
| ANW   | 76.00        | 28.47 | 89.33      | 15.74 | 82.66 | 23.78 |
| Total | 82.05        | 11.10 | 86.51      | 8.476 | 84.28 | 10.04 |

### **Consonant-vowel (CV)**

On the CV task, the monolingual and bilingual group attained a mean percentage of 90.33 (SD=7.76) and 91.33 (SD=6.00) correspondingly; and the total mean percentage was 90.83 (SD=6.89).

### **Consonant-consonant-vowel (CCV)**

In the CCV task, the monolingual group scored a mean percentage of 72.33 (SD=13.81) where as the bilingual group scored a mean percentage of 80.00 with SD=11.14. The total mean percentage was 76.16 (SD=13.03).

### **Consonant-consonant-consonant-vowel (CCCV)**

On the CCCV task, the monolingual group showed a mean percentage score of 61.66 with SD=16.83, while the bilingual group scored a mean percentage of 68.66 (SD=10.41). Their total mean percentage was 65.16 (SD=14.31).

### **Words (W)**

On the word (W) task, the monolingual and bilingual group scored a mean percentage of 93.00 with SD=7.02 and 94.66 with SD=6.28 respectively. The groups obtained a total mean percentage was 93.83 (SD=6.66).

### **Non-words (NW)**

Analogously on the non-word (NW) task, the monolingual group got a mean percentage value of 88.33 (SD=7.91) while the bilingual group scored a mean percentage of 93.00 with SD=5.95. Their total mean percentage was 90.66 (SD=7.33).

### **Geminate words (GW)**

GW task showed a mean percentage of 89.66 (SD=12.99) and 92.33 (SD=8.97) in the monolingual and bilingual group. The total mean percentage for the group was 91.00 (SD=11.15).

### **Geminate non-words (GNW)**

On the GNW task, the monolingual group scored a mean percentage of 83.00 (SD=13.93), while the bilingual group scored a mean percentage of 86.00 (SD=12.20). The total mean percentage for this task was 84.50 with SD=13.07.

### **Polysyllabic words (PW)**

In the PW task, monolingual and bilingual participants scored a mean percentage value of 85.33 (SD=9.73) and 87.00 (SD=11.18). The total mean percentage summed up to 86.16 (SD=10.43).

### **Polysyllabic non-words (PNW)**

On the PNW task, the monolingual group scored a mean percentage of 83.66 (SD=14.25), similarly the bilingual group scored a mean percentage of 86.33 (SD=10.98) and the total mean percentage equaled to 85.00 with SD=12.68.

### **Arka words (ARW)**

Across the ARW task, the monolingual and bilingual participants showed a mean percentage of 72.00 with SD=21.23 and 78.00 with SD=13.49. They showed a total mean percentage value of 75.00 with SD=17.89.



### **Arka non-words (ARNW)**

The monolingual group got a mean percentage of 57.33 with SD=25.45, where as the bilingual group scored a mean percentage of 67.66 with SD=16 on the ARNW task. The groups showed total mean percentage value of 62.50 (SD=21.98).

### **Anuswara -words (AW)**

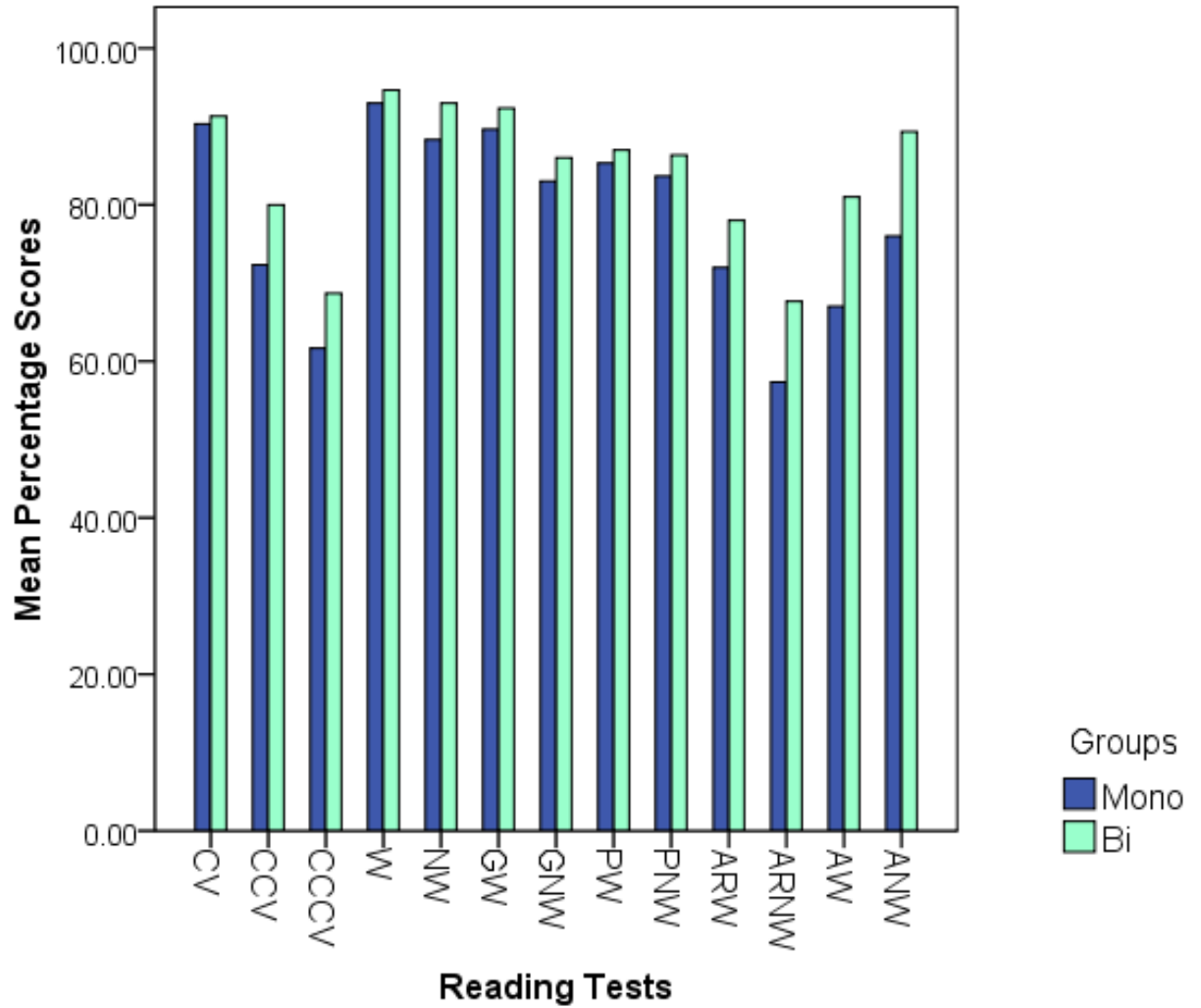
Across the AW task, the monolingual group scored a mean percentage of 67.00 (SD=24.51); the bilingual group scored a mean percentage of 81.00 with SD=15.16 and the total mean percentage was 74.00 (SD=21.40).

### **Anuswara non-words (ANW)**

In the ANW task, the monolingual and bilingual group secured a mean percentage of 76.00 with SD=28.47 and 89.33 with SD=15.74 and they showed a total mean percentage value of 82.66 (SD=23.78).

The overall total mean percentage scores across the tasks for the monolingual group was 82.05 (SD=11.10); bilingual group got a total of 86.51 (SD=8.47). The overall total score for both the groups on the reading tasks was 84.28 (SD=10.04).

In order to find out the difference between the two groups across the reading tasks, the data was subjected to Bonferroni test. The scores were statistically significant at {Mono= [F= (12,348) =31.605, p < 0.05], Bi= [F= (12,348) =50.041, p < 0.05]}. The performances of the monolingual and bilingual groups across the reading tasks in percentage are depicted in the graph-2.

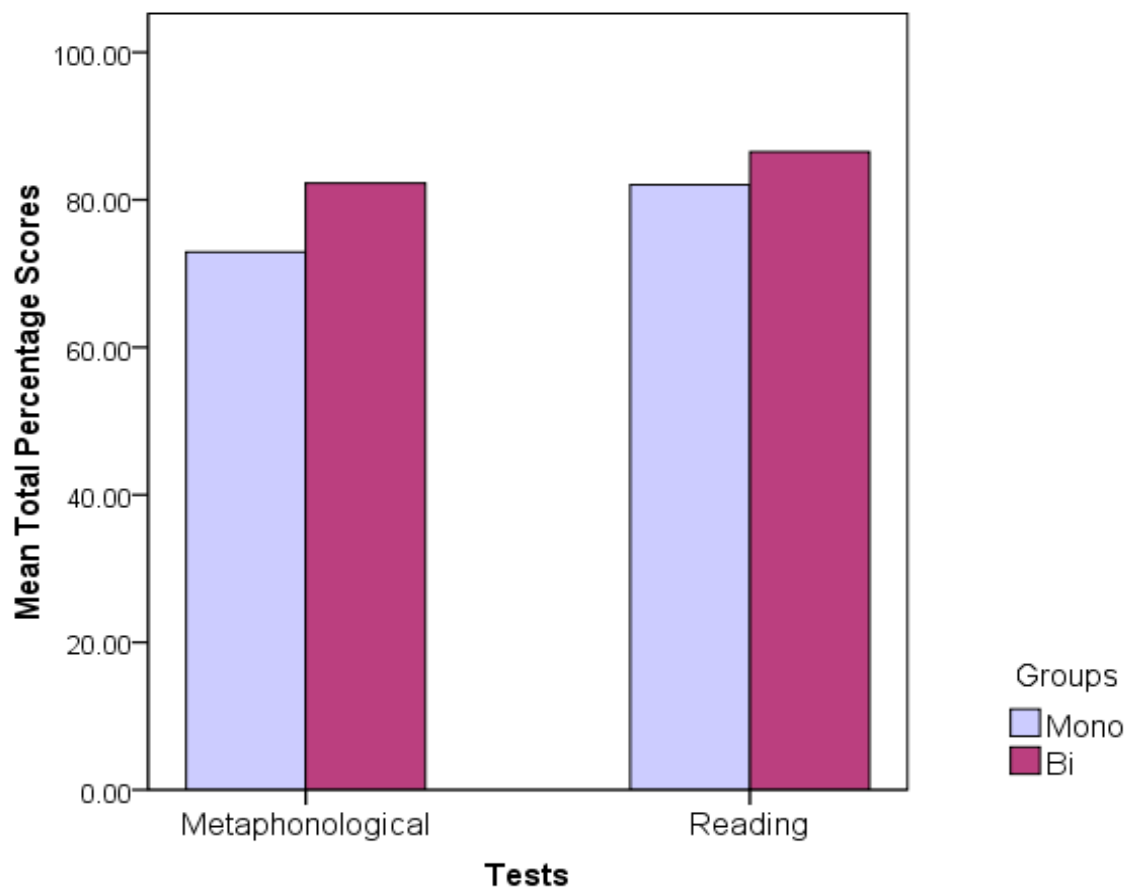


<sup>φ</sup>Graph 2. Mean total scores of the monolingual and bilingual group across the reading tasks.

<sup>φ</sup> CV-consonant-vowel, CCV- consonant-consonant-vowel, CCCV- consonant-consonant-consonant-vowel, W-words, NW-nonwords, GW-geminate words, GNW-geminate nonwords, PW-polysyllabic words, PNW-polysyllabic nonwords, ARW-arka words, ARNW-arka nonwords, AW-anuswara words, ANW-anuswara nonwords, Mono-minolinguals, and Bi-bilinguals.

It is apparent from graph-2 and table-5 that the mean performances of the participants in CV, W, NW, GW, GNW, PW and PNW were almost same with not much difference in their mean values. Alternatively the mean values for CCV, CCCV, ARW, ARNW, AW and ANW showed higher differences.

Also, the performances of the two groups across the meta-phonological and reading tasks are illustrated in the graph-3.



<sup>δ</sup>Graph 3. Mean total scores of the monolingual and bilingual group across the meta-phonological and reading tasks

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<sup>δ</sup> Mono-monolinguals, Bi-bilinguals

It is evident from graph-3, that the bilingual group showed better performances on the meta-phonological and reading tests.

The research findings in equivalence and in disparity with that of the current study are discussed in conjunction to the Western literature and also bearing in mind the Indian perspective.

In view with the literature, rhyme recognition and syllable stripping are the earliest of the skills which are learnt and mastered by children. Karanth and Prakash (1996) and Rekha (1997) reported that beginning readers of a non-alphabetic script (Kannada) revealed that phonological awareness is greatly influenced by alphabet like features present in the orthography and not by rhymes. This study supports the fact that bilingual performed better than monolingual children. Also a research report by Read, Zhang, Nie, and Ding (1986) reported that some aspects of phonological awareness may not be because of maturational factors but may be a consequence of learning an alphabetic orthography. This study supports the finding of the current study where in bilingual children performed better than monolinguals owing to the fact that learning an alphabetic language may encourage and/or enhance phonological awareness in bilinguals.

Further the present study also gets evidence from the investigation done by Durgunoglu and Oney (1999). These researchers investigated the phonological awareness skills using phoneme stripping tasks and reported that phonological awareness is one of the critical skills in the acquisition of reading an alphabetic orthography and also important for the development of this skill as a function of the characteristics of spoken language, orthography and literacy instruction.

The current study also throws insight into findings suggesting that bilingual children perform better on the meta-phonological tasks which in turn promotes learning to read alphabetic script. In agreement with this finding, support comes from the study by Prakash et.al (1993) who reported that the ability to manipulate the structural features of a language is facilitated by literacy in general and by the features of the type of script employed in literacy skills in specific. There also seems to be a bilingual enhancement effect. Analogous research has been supported by researchers like Loizou, Stuart 2003; Shwartz, Geva, Share and Leikin, 2005, Ching-ning Chien, Kao and Li Wei, 2008; Dodd, So and Lam, 2008.

Mishra and Stainthorp (2007) have reported that the cross-language transfer and facilitation of phonological awareness to word reading is not symmetrical across languages and reported that it may depend on the characteristics of the different orthographies of the languages being learned and/ or whether the first literacy language is also the first spoken language. This is in consonance with the observation made in the current study.

With respect to reading abilities, it is evident from the mean scores that across the reading tasks, the bilingual children performed better than monolingual children. Morais et.al (1979, 1986) and Read (1986) reported that people who did not have direct experience with alphabetic orthography were unable to carry out phonological segmentation tasks. This finding may be attributable to the observation that bilingual children showed better score (7.76 SD=1.38 in the monolingual group and 8.83 SD=1.36 in the bilingual group) on phoneme stripping and (5.80, SD=1.39 in the monolingual

group and 7.63 with  $SD=1.40$ ) on the phoneme oddity tasks. Their exposure to the alphabetic script (English) might facilitate phonological awareness skills. This finding goes in hand with the similar findings reported by Prakash and Mohanty (1989), Malini (1996), Rekha (1996) in Indian children.

The bilingual children revealed slightly better scores when compared to monolingual children on the non-word reading tasks (18.60 with  $SD=1.19$  in the bilingual group and 17.66  $SD=1.58$  in the monolingual group). This finding is in harmony with the study done by Prema (1997) where she reported that children might show the absence of logographic reading in Kannada.

Also the research report by Surabhi Bharathi (2004) suggests that there seems to be Universal Grammar (UG) plays an important role in the process of L2 and L3 acquisition and also suggests that Common Underlying Conceptual Base (Kecskes and Papp, 2000) that multilinguals seem to possess.

As reported by Vasanta, (2004); Hamilton and Gillon (2006) and the result of the present study suggests that phonological awareness knowledge interacts during the reading words and non-words in such a way that children exposed to more than one language and formal literacy instruction are more affluent in accessing phonological knowledge as compared to children with less able-bodied orthographies. Thus, the present study further strengthens the earlier research findings.

However, contrastive views about the finding of the present study have been reported by Mann (1986). He documented that Japanese children who were not exposed to alphabetic script were able to successfully complete the phonological segmentation

tasks by the time they reached IV grades. Similarly Morais (1991) claims the fact that entire writing system need not be alphabetic for development of phonological awareness. A non-alphabetic script would allow development of phonological awareness skills to certain degree depending on specific orthographic features of the script.

Thus, the findings of the present study provide corroborative evidence to the earlier research findings that bilingual children have an advantage over the monolingual children across the meta-phonological skill learning which in- turn facilitates reading.

The reading skills should be viewed in a more holistic view, not only considering the meta-phonological tasks. These tasks do act as a catalyst in acquiring reading skills. However, there are several factors which are beyond meta-phonological awareness such as communicative abilities and environment, mental status of the child, cognitive load, literacy level of the parents, media, etc which actively facilitate reading.

In summary the findings of the relationship between meta-phonological and reading skills can be outlined as:

- The results were statistically significant between the two groups.
- The bilingual groups have greater advantage in terms of learning alphabetic script, literacy and new language learning as compared to the monolingual group.
- Findings of the present study substantiate the reported literature.

### **III. Qualitative analysis of the performances of the two groups across the tasks**

Qualitative analysis was further carried out to study the nature of performances exhibited by both the groups across the two tests. The nature of performances between the groups is discussed in the following manner:

#### **Meta-phonological tests**

- |                      |                      |
|----------------------|----------------------|
| a. Rhyme recognition | c. Phoneme Stripping |
| b. Syllable oddity   | d. Phoneme oddity    |

#### **Rhyme recognition**

In this task, the monolingual group showed difficulty in understanding the instructions; the instructions were repeated. They had difficulty in picking out the pair which did not rhyme. While the bilingual group did not exhibit any difficulty in understanding the instructions.

#### **Syllable stripping**

Few of the participants demonstrated difficulty in deleting the syllable in the middle position. However, they could easily delete the syllables in the initial and final position. This finding is in agreement with the research work done by Goswami (1994), where she reported that the 'onset' (initial syllable), and 'rime' (final syllable) are relatively easier to delete than the 'coda' (middle syllable) which is attributed to the inability to perceive the intra-syllabic difference.



## **Syllable oddity**

In the syllable oddity task, for both words and non-words, frequent repetition of instruction were asked by the monolingual group, while bilingual group asked lesser repetitions, also they showed faster responses on the syllable oddity for words task compared to monolingual group. In the syllable oddity for non-word task, some of the participants demonstrated memorizing strategies like counting on fingers to pick out the odd one out , whereas some of the participants relied on the articulatory movements of the tester and picked the odd one out (in both the groups). Also, for this task some participants indicated the odd one out as the 1<sup>st</sup> or 2<sup>nd</sup> etc... rather than eliciting the exact odd one. It was observed that the odd syllable being in the middle position of the word e.g. jaDeya, sumaaru, goDege, kaDedu (words), punima, kitabu, venida, tuniya (non-words) was the most difficult to spot for both the groups. There are research reports supporting this finding where in a study by van Kleeck (1982) accounted that oddity tasks require higher cognitive skills than deletion and hence these skills are late to develop. This also shows that the participants used different strategies to learn, store, and retrieve. These strategies such as counting on fingers, reading the articulatory movements act as facilitators for retrieving from the short term memory. This finding is supported by Paris, Wasik and Vander Westhuzin (1988) who reported variation in meta-cognitive awareness as related to variations in reading abilities.

## Phoneme stripping

Most of the participants in both the groups could not accomplish the phoneme stripping task particularly on four words which were:

- i. puuraikke – ai = puurke,
- ii. madhyama – dh = mayama
- iii. miinum – m = iinu
- iv. kooLi – k = ooLi

The support for this finding comes from a study reported by Prema (1997) where she reports that “phoneme stripping is more difficult than syllable stripping, the two special graphemes which have phonemic status in Kannada (‘Arka’ and ‘Anuswara’) were deleted. On similar lines as that of syllable stripping children found stripping/deletion of ‘arka’ and ‘anuswara’ easier than regular phonemes (‘o’, ‘e’)”. She attributed this to the nature of these atypical phonemes which enjoy independent grapheme status in Kannada.

## Phoneme oddity

Most of the participants in both the groups had difficulty in choosing the odd word out in which the phoneme appeared with kaaguNita<sup>r</sup> series e.g. kota, daage, baatu, maachi. This finding could be attributable to the fact that phoneme awareness is one of the later skills to be developed in comparison to syllable awareness and also since Kannada being a semi-syllabic script it is more difficult for children to perform on tasks involving phonemes.

## Reading tests

- Syllable inventory.
- Arka words and non-words.
- Anuswara words and non-words.

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### <sup>r</sup> Basic Language Rule in Kannada

When a dependent consonant combines with an independent vowel, an **Akshara** is formed.

**Consonant (Vyanjana) + Vowel (matra) → Letter (Akshara)**

**Example:** ಕ್ + ಅ → ಕ

**IPA form:** /k/ + /a/ → /ka/

Based on this rule we can combine all the **Consonants (Vyanjanas)** with the existing **Vowels (maatras)** to form **kaaguNitha** for Kannada alphabets.

**E.g. 1:** ಕ್ + ಆ → ಕಾ      **E.g. 2:** ಕ್ + ಇ → ಕಿ

**IPA form:** /k/ + /a:/ → /ka:/      /k/ + /i/ → /ki/

## **Syllable inventory**

The most common error made by the participants in both the groups on the CV reading task was the CV 'khaha' was read as 'kham'. Most of the participants had difficulty on CCCV especially reading the CCCV 'smra', 'mlya' 'sthya', 'sthai', 'dvai'. This could be attributed to the complexity of the stimuli. As a consequence of this children were not able to articulate clearly on reading task, showing the simplification of the target words. However, on imitation their performance did improve indicating that cues do influence the articulation skills.

## **Arka words and non-words**

On this task, most of the participants especially in the monolingual group, and few of the participants in the bilingual group did not have the realization that the 'arka' is uttered first, but written following the syllable across the words and non-words. Some children managed to read the frequently occurring words without realization. E.g. karna:Taka, shourya.

## **Anuswara words and non-words**

In this task, participants of the monolingual group read the 'anuswara' (O) as zero whenever it preceded the syllable instead of reading it as /m/ or /n/ or /ŋ/ depending on the word context. This could be attributed to the fact that the frequency of occurrence and exposure to 'anuswara words' between 8-9 years is comparatively less. Also some participants showed ease on reading non-words. This can be supported by the results of the study done by Prema (1997) where she reported that children might show the absence of logographic reading in Kannada. Research carried out by Karanth and Prakash (1996)

illustrated that acquisition of 'anuswara' leads 'arka' in the lower grades, this is in support to the observation of the current study, where in both the groups scored better on the 'anuswara' words than on 'arka' words. However Prema (1997) reported that there was a parallel development of 'arka' and 'anuswara' words from third grade onwards.

In summary, the qualitative analysis revealed that both monolingual and bilingual children applied certain strategies either to simplify or to remember the various sub-tasks of the meta-phonological and reading tasks. It was also seen that as the complexity of the stimuli increased there was decline in the performances across the different meta-phonological and reading tasks. The qualitative investigation also showed that children had difficulty both deleting and picking the odd syllable or phoneme when it appeared in the middle position of the word. On the reading tasks few participants demonstrated difficulty in reading some of the CCCV words, 'arka' and 'anuswara' words and non-words.

## CHAPTER 5

### SUMMARY AND CONCLUSION

The current study primarily intended to investigate the meta-phonological abilities in monolingual and bilingual children between the age range of 8-9 years.

The objectives of the study were to:

- Quantitatively study the gender differences across the two groups on the meta-phonological and reading tasks.
- Quantitatively study the performances of the two groups on the meta-phonological and reading tasks.
- Qualitatively analyze the performances of the meta-phonological and reading tasks.

Foregoing research in the field of meta-linguistic and reading abilities have been very vast. The research reports have focused to study the development of phonological and word awareness. There have been reports suggesting that acquisition of these skills are parallel and/or as a consequence and/or precedes reading skills. Studies have been designed in view of the different variables (age, gender, SES, literacy instruction, language learning etc.) which might influence the development of the meta-phonological and reading skills. Most of the literature documented have concluded that typically developing females and males perform equally well on the meta-phonological tasks. The variables like SES, age etc. have distinctive influence on the development of these skills. Consistently studies have shown that bilingual children (who are exposed to more than

language) seem to have an advantage in learning meta-phonological skills which improve reading. (Loizou, Stuart, 2003). Researchers have concluded that meta-phonological skills like rhyme recognition and syllable awareness are the earliest predictors of reading ability.

Thus, the present study was taken up with the purpose of investigating the meta-phonological and reading abilities in monolingual (children exposed to Kannada, a semi-syllabic script) and bilingual (children exposed to Kannada and English, a semi-syllabic and alphabetic script respectively) in the age range of 8-9 years.

The study included 30 monolingual and 30 bilingual (15 females and 15 males in each of the groups). They were matched for age, gender, language and literacy.

Meta-phonological and reading tests of RAP-K, (Prema, 1997) were used in the study. The percentage scores for the groups were tabulated using a SPSS (version16.0.) package. The mean and SD were computed for female and male participants in both the groups. MANOVA and Bonferroni test was carried out to find out the difference across the two tasks and gender in both the groups. Later, the data was grouped together as there was no significant difference between the genders for the tasks. Repeated measure ANOVA was carried out to find out the difference between the two groups across the meta-phonological and reading tasks. Later, the data was subjected to Bonferroni test to find out if there was any significant difference between the two groups across the tasks. Qualitative analysis of the performances of the two groups was performed for meta-phonological and reading tests.

The overall findings of the present study can be recapitulated as follows:

- The female and male participants performed equally on the meta-phonological and reading tasks however there were subtle differences in the mean percentage scores. This shows that SES, literacy instruction, language learning environment etc. are all independent of the gender variable between 8-9 years. There appears to be developmental trend in the acquisition of meta-phonological skills. The findings of the current study also suggest that the cognitive load entailed by the children is equal amongst female and male participants in the acquisition of meta-phonological skills. Reading skills on the other hand, should be viewed holistically, taking into consideration other aspects like communicative abilities, environmental factors, mental status of the child, literacy level of parents, media, apart from the meta-phonological skills which does play a vital role in reading acquisition.
- Bilingual group performed better than the monolingual group on the meta-phonological and reading tasks suggesting that they have an advantage in fine-tuning and growth of meta-phonological and reading skills.
- On the meta-phonological tasks, it was seen that rhyme recognition and syllable stripping tasks were the easiest to accomplish in both the groups, although bilingual children performed slightly better than monolingual children. It was observed that phoneme stripping and oddity tasks showed low scores in both the groups, however bilingual performed slightly better. This could be attributed to the fact that since Kannada (L1) is a semi-syllabic language, syllable awareness is



acquired earlier and the phoneme awareness is late to develop. This finding is supported by Trieman and Baron (1981) and Blachman (1984).

- On the reading tests, in the syllable inventory sub-test, as the complexity of the inventory increased the deterioration in the performances of participants was evident. Word and non-word reading showed the highest scores followed by geminates (words & non-words), polysyllabic words (words & non-words), anuswara (words & non-words) and lastly arka (words and non-words).
- Qualitative analysis gives an insight about the performances and errors which were observed in both the groups. The errors which were not tapped out by the quantitative analysis. It was observed that on the oddity tasks, children in both the groups used strategies like reading the articulatory movememnts, counting the number of syllables in the word, in order to retrieve the memorized syllables to pick the odd one out. A consistent finding in both the groups was that they had difficulty in deleting the middle syllable on the syllable stripping tasks. This is further supported by Goswami (1994). She attributed to the inability to perceive the intrasyllabic difference.
- On the reading tasks, it was observed that as the complexity of the stimuli increased there was deterioration in the performances was observed. They simplified the articulation of the target words. It was also observed that the children (in the monolingual group) did not exhibit realization for 'arka' where, it is uttered first, but written following the syllable across the words and non-words, but managed to read the frequently occurring words. For the 'anuswara' word and

non-word reading tasks, participants of the monolingual group read the ‘anuswara’ (O) as zero when it preceded the syllable instead of reading it as /m/ or /n/ or /ŋ/ depending on the word context. This could be attributed to the fact that the frequency of occurrence and exposure to ‘anuswara words’ between 8-9 years is comparatively less. It is noticed that some participants read non-words with ease. This can be supported by the results reported by Prema (1997) where she stated that children might show the absence of logographic reading in Kannada.

On a concluding remark, it is apparent from the findings that though there are differences in the performances of the monolingual and bilingual children on meta-phonological tasks, these differences do not hamper but promote literacy skills.

## **IMPLICATIONS OF THE STUDY**

The results of the present study are of clinical significance as it has been observed that rhyme recognition and syllable awareness are the earliest indicators of reading abilities in both the groups. This trend has to be kept in mind while assessing and planning treatment program for children with developmental disorders e.g. learning disability, specific language disorders, and phonological disorders.

This study also gives scope for clinicians assessing and planning intervention programs for children with developmental disorders who are exposed to more than one language such as Kannada, semi-syllabic script (L1), and English, alphabetic script (L2). Thus, it is imperative in the Indian context where bilingualism is a common phenomenon,

assessment of children in L1 and L2 becomes crucial. Hence, it is proposed that separate assessment protocols should be made in L1 and L2 in order to arrive at clear consensus about the assets of bilingual children.

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