

RUNNING TITLE: BILINGUALISM AND COGNITION: A REVIEW OF A
METALINGUISTIC TASK OF PHONOLOGICAL AWARENESS IN BILINGUAL
CHILDREN

Abstract

Certain aspects of meta-linguistic awareness are known to be essential for bilingual children's literacy acquisition. Phonological awareness is one of these skills. Beginning with a discussion of a pivotal developmental research model of control & analysis of cognitive skills in bilinguals, this review will discuss several studies that explored phonological awareness in bilinguals who knew different languages. Presented herein also are the author's own observations about what needs to be studied further in the field of cognitive development and bilingualism, which can add to the existing knowledge base about a specific metalinguistic skill for language acquisition: phonological awareness. Implications of bilingualism are also discussed in the context of bilingual advantage and its impact on bilingual literacy.

“Knowledge of language is knowledge of a nonphysical system with infinite combinatorial possibilities”. Damon and Lerner, 1998, p. 366.

Bilingualism in early childhood and its effect on the cognitive development of bilinguals has been studied from various perspectives in language development and related research literature. It is the capacity of language to represent knowledge that is responsible for its mediating effects on cognition (Homer, 2002). Drawing from the theoretical evidence presented in the research studies of Bialystok (2001), this review highlights the research findings related to three research questions about bilingualism in this thesis. These questions are following:

- a) What is the effect of bilingualism on metalinguistic skill of phonological awareness?
- b) Do bilingual children differ from monolinguals (in specific language-wise from other bilinguals), in their language proficiency due to higher metalinguistic level, because phonological awareness skill is more developed in them across different languages?
- c) Whether literacy in bilinguals is positively influenced due to their bilingualism? In specific, how does language skills transfer in metalinguistic ability of phonological awareness might be viewed as a factor contributing to an improvement in early language acquisition during literacy learning?

Then, a discussion about possible bilingual advantage, in the context of metalinguistic knowledge in literacy learning and language acquisition will be presented by exploring specific research findings on phonological awareness, as this construct has been studied in bilinguals.

In her article on acquisition of literacy in bilingual children, Bialystok (2002) states that, “if phonological awareness transfers across languages, then bilingual children who speak languages that differ in their accessibility to phonological structure may benefit by transferring metalinguistic understanding of one language to their other language” (p. 185). In other words, a question is formed: Does phonological awareness transfer across languages? In answering the main research questions in this review, this question will be addressed as well.

The paper is divided into multiple sections for different languages that were selected to make sense of the existing data from research literature, as it described the advantage or no advantage in bilingual children who speak their particular native languages and also learnt English or another language as their second language. Therefore, restriction to one particular set of languages, first language (L1s) and second languages (L2s) is not followed while collecting relevant research articles to review in this paper. Both character and alphabetic languages are included to get a fuller view of the extent to which phonological awareness does seem to have a bearing on bilingual children who speak more than one language.

BILINGUALISM AND COGNITION: METALINGUISTIC SKILLS

Metalinguistic Skills: Phonological Awareness. Metalinguistic skills refer to those cognitive skills, which allow conscious thought about language. Phonological awareness is one such metalinguistic skill. It is the ability to identify sounds that comprise words in language. The construct of phonological awareness has been explored in a variety of ways and from very different research perspectives and theoretical hypotheses (Byrne and Fielding-Barnsley, 1991; Poskiparta, Niemi, and Vauras, 1999;

Huguet, Vila, and Liurda, 2000; Goetz, 2003; Yamashita, 2002; and Nathan, Stackhouse, Goulandris, and Snowling, 2004).

In defining phonological awareness, Castles and Coltheart (2004) stressed the importance of both *phonological* and *awareness* by the following: “The “awareness” component of the term is as important to the definition as the “phonological” component, for the skill is proposed to involve, not simply unconsciously discriminating speech-sounds, but explicitly and deliberately processing and acting upon them”(p.78). *This* is the purpose of the present article i.e., to highlight the existence of a certain cognitive capability of phonological awareness as a metalinguistic skill, which might be partially responsible for better language acquisition, cross-linguistic competency and literacy learning in bilingual children. Once this is ascertained, then we can move towards identifying the precise qualities that should be present in the cognitive armamentarium of a bilingual child for her to excel in language acquisition literacy learning, since she already has the advantage of being bilingual.

In one study by Dreher and Zenge (1990), metalinguistic awareness was found to account for as much variance in reading comprehension in fifth grade as in third grade. In this longitudinal study, children’s metalinguistic performance was monitored in three ways, including their understanding of reading as a meaning-gathering process, their ability to identify language segments (letters, words, sentences), and their ability to define instructional terms that were used in class. All of these implied evaluation of children’s ability to think about language as they shift from learning to read in third grade to reading from text in fifth grade. This is identified as a crucial stage from a cognitive skills’ developmental hypotheses’ perspective. Furthermore, this study was successful in

showing that “first grade metalinguistic awareness was a statistically significant predictor of student’s reading comprehension performance in both third and fifth grades” (p.13).

One observation from this study is important as it indicates that in terms of phonological awareness (i.e., the ability to identify language segments, words, letters, and sentences), prior instruction and academic aptitude of children included in this study facilitated their ability to perform adequately on metalinguistic tasks. Beyond the language acquisition stage for monolinguals or bilinguals, the specific foundational or auxiliary role being performed by phonological awareness needs further research.

Literacy and Bilingualism. A number of research studies have indicated the importance of bilingualism for literacy learning. For example, Bialystok (2001), in her model of bilingualism in development, highlights particular areas where bilinguals may have an advantage, developmentally and linguistically, in educational settings. She also acknowledges that the conditions that allow bilinguals to fully utilize their cognitive resources in acquiring another language are sometimes hard to keep or even to have in the first place.

As a guide, the breadth and depth of the research on monolingual children can provide reference points for us to understand what might be necessary in educating bilinguals to become literate. Bialystok’s observation is that, “there are myriad ways in which a child can be bilingual, and these seem to be particularly important in the way each one influences the child’s acquisition of literacy” (2001, p.152). This statement has a valid point as it clues us into keeping in mind that within the bilingual research spectrum, there can be various differences in case of each bilingual child and thus, “the progress in acquiring literacy by bilingual children will depend in part on social, political,

and educational factors that define the child's environment at the time that literacy is introduced" (Bialystok, 2001, p. 153).

Equivalence in Bilingualism and its Cognitive Imperatives. There is contention of what constitutes a cut off point for considering equivalence in bilingual language acquisition, an issue that has been investigated in Bialystok (for further reading, see 2001). The reason why this distinction is important above and beyond the comparisons between monolinguals and bilinguals is that, the amount and the quality of language exposure in a literacy learning context, can make a difference in the degree to which bilingual advantage can be ascribed to development of meta-linguistic awareness as accounted by phonological awareness, either alone or in combination with associated skills. This issue will be addressed later in the review.

Cross-Linguistic Transfer of Phonological Awareness: A case for Spanish-English Bilinguals. Spanish is one language that has repeatedly been shown to have a cross-linguistic transfer of skills to English language n bilingual children. In a study by Durgunglo, Nagy and Hancin-Bhatt (1993) researchers found that in word identification task, readers' performance on English language word recognition and pseudo word recognition ability was predicted by levels of Spanish phonological awareness and Spanish word-recognition skills. This cross-language skills transfer phenomenon, has been explored in similar research studies, which confirms that cross-language transfer of metalinguistic skills does take place (see Bialystok, 2001).

Chomsky (2001) has also referred to phonological aspects understanding language in stating that, "the phonological component, on the other hand, maps

derivations of narrow syntax to a phonological form which can be interpreted by the sensori-motor interface, and it is thought to be highly variable among languages” (p.4).

Language as a Mediation Tool & Stage Theories of Language Acquisition. Homer (2004), in his review of literacy as a mediating tool describes the relationship of metalinguistic awareness from the direct link with the phonological knowledge of the scripts that bilinguals might be using in an effort to reflect on their language. Homer draws upon the work by Olson (1994, 1999) on the relationship between speech and writing. Olson proposes that what is learned when one learns to read is that, besides sounding out graphic signs by knowing the sounds produced by individual letters, readers gain segmentational knowledge and by way of seeing written text, or with an exposure to print, “phonological form is represented, perceived or brought into consciousness” (p. 93).

To logically extend the concept of language as a mediating tool (Homer, 2002), it can be said that in case of bilinguals, the evidence of cross-language facilitation in language acquisition may take place as bilinguals use their developed cognitive skills from their first language. Thus for bilinguals, syntactic parsing and phonological knowledge of already learnt language systems, together with the “mediation” function that language serves for them, allows them to have an advantage due to being bilingual.

Research also shows that prior literacy in a first language greatly increased the ability of a person becoming literate in a second language. Similarly, a considerable body of research has established that phonological awareness and reading acquisition have a reciprocal interaction in stage theory literature on language research (see review article

by Stuart, and Coltheart, 1988). Bialystok also refers to stages in development of bilingual language development and literacy (2001).

Other factors influencing Bilinguals. Besides cognitive factors and individual differences within bilinguals' inherent differences in and between the languages that bilingual children learn or gain literacy in also introduce decisive differences in literacy learning. According to Bialystok, "Each language bears a slightly different relation to its printed form, each writing system represents the spoken language in a somewhat different manner, each social group places a different premium on literacy and provides different levels of access to it, and each educational system resolves the pedagogical issues independently (p. 153). Similar observations have been made in greater depth in language research elsewhere (cf. Jackendoff, 2002).

ANTECEDENTS OF BILINGUAL DEVELOPMENT IN LANGUAGE

Antecedents to Bilingualism. Research on lexical access, word conception, word memory and the consequent word retrieval (Hernandez, Bates, and Avila, 1996) shows that bilinguals operate fluently or non-fluently, with accuracy or in delayed fashion, in speech production in a given language, based on cross-language translation conditions. In their study, Hernandez et al. explored cross-linguistic priming in Spanish-English bilinguals. The authors presented bilinguals with single language auditory texts accompanied by visual target words under four different conditions including, low priming, high priming visual degradation, delayed naming and speeded naming. This study included a "true" cross-modal naming (i.e., the time required to pronounce a visual word in an auditory context" (p.849). There were four different experiments in this study. Bilinguals were given texts to read and then lists of words were given that were pre-

designed to evaluate priming effect from one language (Spanish) to another (English). Experiments consisted of cross-modal word pronunciation in blocked design, with visually degraded stimuli, and with delayed naming conditions. Participants were given with-in language and between language tests to as measures of their priming abilities. Mean reaction times and error rates were noted to see which group was better in priming. An important observation from this study is that “bilingual language processing necessarily involves a complex set of processing trade-offs that extend beyond the structure of the lexicon“(p.849). Results from this study supported the idea that cross-linguistic priming in sentence-context involved, “buildup of information of the physical form of the word” (p. 846).

Language Competency Hypotheses. Another line of research indicates that a basic level of competency must be achieved before the cognitive benefits of bilingualism can be experienced (Baker, 2003). Bilinguals are also said to be developmentally ahead than monolinguals. Linking cognitive gains to bilingualism calls for paying attention to a combination of factors that are to be assessed in the context of interdependent structure. For instance, Costa, Golome, Gomez, and Sabestian-Galles (2003), authors argue that in order for semantic system activation of the lexical nodes of the two languages of a bilingual are linked through phonology. The activation of the lexical nodes spreads to the phonological segments, and pictures with cognate names should be named faster than pictures with non-cognate names. Costa et al.’s study included Spanish-Catalan bilinguals and used a picture-word interference paradigm, which requires participants to name a picture, while ignoring presentation of a distractor word. Participants in this study were asked to name pictures in L2 (Catalan), while ignoring distractor words from L1

(Spanish). They found that phono-translation effect reached significant levels, in naming target words where distractor words were phonologically related to the target word's translation. Thus, the results underscore the importance of phonological awareness of the bilingual for them to be able to concentrate on correct identification while ignoring deliberately introduced distractor from L2.

All of these elements facilitate the use of metalinguistic thinking skills and create a situation where bilingualism can become advantageous for the bilingual child. This observation is also confirmed by similar research studies done in the area of cross-linguistic skills transfer of word identification, fluency and accuracy (Durgunolo, Nagy and Hansen-Bhatt (1993). Durgunolo et al.'s, study supports the hypothesis that for word recognition skills, the ability to process words using phonological awareness in within language (Spanish) and across languages (in English from Spanish), is predictive of transfer of phonological awareness skill. Since both of these language structures are alphabetic, children could identify the subcomponents of spoken words and understand how the orthographic symbols for the written words mapped onto their phonological subcomponents.

BIDIRECTIONAL EFFECTS OF BILINGUALISM

Bi-directional Effects in Bilingualism. Research has also shown that bilingualism can have bi-directional effects on reading acquisition and consequently on meta-linguistic skills, including phonological awareness. Strong theoretical and conceptual arguments support this are presented in a review by Takakuwa (2000), who describes various models and studies' designs used in studying bilinguals, pointing out the problems with research done in the area of language acquisition. He observes that in some studies,

bilinguals scored higher than monolinguals on intelligence measures, whereas in others they scored lower. Results of such conflicting evidence have led researchers in the language field to look in more varying ways at different aspects of bilingualism. For instance, research with adults in bilinguals has pointed to consideration of individual differences in case of Farsi-English speaking graduate students (Nassaji & Geva, 1999). Investigators in this study found that efficiency in phonological and orthographic processing contributed significantly to individual differences on reading measures, which were included as criterion measures for this study. These were reading comprehension, silent reading rate, and the ability to recognize individual words.

Upton and Lee-Thompson (2001), describe the role of first language in reading second language for Chinese and Japanese bilinguals who were studying in United States. These bilinguals used their cognitive resources from L1 to understanding L2 or English. Results from this study conferred with the premise that L2 readers have access to their first language (L1) as they read printed text in L2 (p.469).

Speaking of the benefits of being bilingual, Bialystok and Hakuta (1994) state in their book, *In other Words*,

The enriching aspect of bilingualism may follow directly from its most maddening complication: it is precisely because the structures and concepts of different languages never coincide that the experience of learning a second language is so spectacular in its effects.

BILINGUALISM AND PHONOLOGICAL AWARENESS

Bilingualism and Phonologically Associative Skills. Homer (2002) presents with a view on stages of language acquisition through which, while learning a language,

“children actively construct their own knowledge”. Based on Ferreiro’s theory about pre-literate children’s language learning, Homer finds that making sense of written text becomes possible when children are able to “match letters to sub-syllabic units (phonemes).”

In a study with preschool children, Foy and Mann (2001) acknowledge the “clear relationship” between phonological awareness and early reading ability. They examined rhyme awareness, phoneme awareness, articulatory skill assessment, analysis of speech perception, vocabulary, and letter and word knowledge in children ages 4 to 6. Tests of reading ability and cognitive batteries were used to determine the baseline levels of each of the component skills mentioned above. Although, results from their study did not identify phonological representation as a unique contributor to children’s skills in reading, yet they found a pattern of associations between spoken language tasks and various aspects of phonological awareness. They concluded that vocabulary knowledge and age might be the factors that account for differences between children with low phoneme awareness and those with high phonemic awareness.

Phonological Awareness in relation to Literacy. Numerous studies (see Byrne & Fielding-Barnley, 1991, 1993; Brennan & Ireson, 1997; and Santi, Menchatti, & Edwards, 2004) indicate that including phonological instruction can improve the reading skills of young readers. This helps in preparing preschoolers in alphabetic principle, reading fluency, awareness of word components and higher comprehension language skills. A more thorough linguistic and cognitive approach towards accessing phonological content of words is discussed in Levelt, Roelofs, and Meyers (1999). These authors describe a model for lexical access in speech production and theorize that

phonologically similar words can activate and facilitate the activation of similar words across languages. This model can be tested and applied to see if similar writing systems evoke activation responses based on phonetics of words across similar language systems.

Analysis and Control Model of Bilingualism. Bialystok (1988), on the other hand, explains what happens with analysis of knowledge and control processing, when linguistic awareness is used in solving metalinguistic problems. In this particular study she included three different groups of children; monolingual English speaking, partially bilingual French-English speaking and the third group of fully bilingual French-English speaking children from Grade 1, with age range of 6.5 to 7 years. These children were assessed using arbitrary-ness of language (Piaget's famous sun-moon problem and a cognate task in which sun-moon is replaced with cat-dog), concept of word and syntax correction tasks. All of these sub-tasks made children think about language before solving the given metalinguistic tasks. Children came from similar socio-economic backgrounds, so the issues related to groups' level of literacy was controlled. Peabody Vocabulary Test (PPVT) was administered as a measure of language proficiency. The results from this study again showed that, "fully bilingual group always scored the highest and the monolingual group, the lowest" (p.563). The question arises: *Why was this difference so clear?* Bialystok's study underscored the importance of the levels of bilingualism and it can be argued that the greater exposure in literacy to the simultaneously learnt and used languages can greatly influence the quality of bilingualism. The reason for this phenomenon is that the more practiced children become in their languages, the better their meta-linguistic abilities get developed over time.

Bialystok states that, “phonological awareness is important because of its relation to the acquisition of literacy” (p.176, 2001). In her article, she discussed aspects of metalinguistic awareness, and she identifies metalinguistic tasks for which monolingual and bilingual children exhibited different processes. In furthering her research, Bialystok devised and proposed an alternate view, which involves two cognitive processes: *analysis and control*. According to this model (Bialystok, 1990: 118), there are two aspects of language processing: analysis of linguistic knowledge and control of linguistic processing. They are independent (“specialized for a different aspect of processing”), and interdependent. She found these processes to be active in bilinguals during various experimental conditions. In one of her studies (2001), Bialystok did find that “bilingual advantages occur reliably on tasks that make high demands on control, but are not evident in tasks that make high demands on analysis” (p. 169). Although, according to her, a majority of studies done on the topic of meta-linguistic ability in bilingual children support the presence of a bilingual advantage. Bialystok’s own studies show to a considerable degree, an advantage for bilingual children due to their learning about the sound structure of spoken language, given that the writing scripts for these languages are similar.

As a novel way of studying bilingualism, Bialystok’s emphasis on function (processing), instead of structure (form), opens a new venue for research on bilingual advantage in the context of metalinguistic awareness. Analysis of representational structures and Control of attention are two components in this model. One study by Bialystok, Majumder and Martin (2003) tested children between kindergarten and second grade. There were three different groups of children: monolingual English speaking,

bilingual Spanish-English speaking and Chinese-English speaking children, all of whom were tested on phonological awareness tasks including phoneme-segmentation, substitution and readings tasks, related to guided literacy instruction. Results from the three sub-studies showed that Spanish-English speaking children did better than English-speaking monolingual children, while Chinese-English speaking children did worse on the tasks. Furthermore, this study underscored the importance of a realization that “knowing whether there are bilingual advantages in the development of phonological awareness will contribute to our understanding of metalinguistic ability, bilingual influences on cognitive development and early literacy acquisition” (pp. 27-28).

Importance of Context in Bilingual Literacy. Importance of context is also discussed in research as yet another factor that is important for the use of cognitive skills in bilingual situation. In one of these studies, (Bialystok, 2001) French-English speaking bilingual children were given tests in both languages used in their normal routines. I will discuss only phonological awareness from the subtasks used in this study. For instance, in phoneme substitution task, manipulation of sounds was involved. Children had to replace the initial sound in a word with the initial sound of another word, to create a new word. (E.g., Cat and Mop, new word: Mat). With results from this and other tasks, the study’s tentative conclusion was that, “command in two spoken languages by preschool children gives them no special access to sound structure that is involved in the solution to the phonological awareness task” (p. 32). However, confirmation of the tentative results cannot be given, as the bilingual French-speaking children were tested in English, although they were taught in French. As Bialystok pointed out perhaps a “mismatch” in

language of literacy instruction and language of testing might account for the differences between groups.

LANGUAGE SPECIFIC EFFECTS OF BILINGUALISM

Language-specific Effects of Bilingualism: Some Conclusions. Bialystok et al.'s findings of a differential effect of bilingualism for different languages will be explored below. These studies were done with bilinguals from different languages in different ways. Their results are presented with some discussion of these results.

Dutch Bilingual. Gavarro (2003) studied mechanism of language acquisition in a bilingual English-Dutch child's data, where primarily the derivation of word order and language parameters were evaluated in productions of Dutch and English sentences. The child whose data is presented in her paper, had exposure to English as his Mother's native language, and Dutch was his Father's language. Data from his speech was collected at age 4. Since the study involved word orders in languages, a brief description of the subject, verb and object in both languages is included here. In English language, the word order in a sentence is that of SVO where as in Dutch, there is contrast in main and embedded clauses in the sentences, here the order being SOV. When the speech-productions from the two languages were obtained from the child, these were analyzed for errors in order of words. Results showed that particularly "verb placement errors", will be evident and will increase in bilingual acquisition and it may cause delays also in setting parameters for correct word order across languages. (See Unsworth, 2003 for further reading on cross-linguistic language acquisition in French/Dutch and German/Italian). One of the observations that investigators of this study make is, "in bilingualism

there isn't properly the influence of one language on another, there is the effect of the existence of the lexical items pertaining to different languages" (p. 77).

Spanish-Nahuatl Bilinguals. We will begin the language sections with the study done by Francis (1999). Francis states, "since one learns to read once and subsequently has access to the same text processing and general discourse properties associated with literacy when reading or writing in a second language (L2), there would appear to be no reason to combine the concepts of bilingualism and literacy to refer to a unique or peculiar set of language skills" (p. 533). This makes sense when approached from the stand point of children's consciousness of the languages they spoke and a series of assessments done to evaluate their reading comprehension, writing and oral narrative in both languages, as it specifies that meta-linguistic awareness is related to different aspects of literacy development in different ways.

Although, this study did not involve English as L2, but to illustrate Francis' theory, it is briefly discussed in the context of bilingualism. In this study, the idea of the development of phonological awareness as a meta-linguistic skill is approached from a slightly different perspective. Spanish and Nahuatl-speaking bilingual children from second, fourth and sixth grades were tested for the interaction between their reading and writing skills in both languages. Children read grade-appropriate stories and completed cloze-passages taken from grade level expository texts in each language. For writing tests, Language naming, Written Message Identification (WMI), and matching language with interlocutors was used to evaluate the pragmatic knowledge related to awareness of linguistic categories. The results from reading and writing tests in literacy skills pointed out an important concept of the "interdependence of skills acquisition" (p. 544). For oral

narrative tasks, a strong correlation was found between paired measure in Spanish and Nahuatl. Similarly, reading comprehension tasks showed a strong correlation, as well as performance on the written activity. Another observation made in this study was about *Discourse Context*, which seemed to have greatly helped children in understanding what was asked in language assessments that were given to them across reading comprehension and written tasks. So, “providing context support for the language identification judgment produced a ceiling effect for the metalinguistically more sophisticated fourth and sixth graders” (p. 549).

As Bialystok states, “the discussion of phonological abilities must inevitably include some discussion of literacy context” (p. 28). Again, the issue of “*balanced bilinguals*” with above average literacy skills of oral narration and writing surfaced, indicating that the knowledge about one’s bilingualism – the ability to separate the languages for purposes of reflection and introspection, show an interdependence of literacy related skills and language awareness.

Italian Bilinguals. D’Angiulli, Siegel, and Serra (2001), tested Italian children (ages 9-13 years), who spoke English as well. These bilinguals were tested using phonological, reading, spelling, syntactic and word memory tasks in both languages. Results from this study suggest that English-Italian interdependence was clearly related to phonological processing. More specifically, this study found that grapheme-phoneme correspondences in Italian language may “enhance” phonological skills in English language. Wide Range Achievement Test-revised (WRAT-R), Woodcock reading mastery test, English oral cloze and English working memory were used for English tests, and for Italian tests, Italian word reading, Italian spelling, Italian oral cloze and Italian

word memory tests were used. It was found that skilled readers obtained higher scores than less skilled readers on all tasks related to phonological processing.

Chinese Bilinguals. Cheung, Chen, Lai, Wong, and Hills (1999), tested younger pre-reading Cantonese/Chinese speaking children and English-speaking counterparts who knew Roman alphabet were tested. Authors in this study tested the orthographic comprehension of Cantonese and Chinese writing systems by the bilinguals. Bilingual children in this study were presented small text scripts and they were assessed for their phonological awareness skills, as affected not only by learning spoken languages, but also how they understood character versus alphabetic language structures. Results from this study led to the conclusion that “orthographic and spoken language experience both impact on the development of phonological skills which implies a mediating function of phonological awareness in integrating sound information derived from reading and perceived speech” (p. 227).

This study aimed to look at the relationship between development of phonological awareness as a function of early experiences with both the phonology of the spoken language and the orthography of the written script. Pre-reading and reading children from three different backgrounds were tested in this study on their phonological awareness performance. The study explored whether phonological awareness is a multi-level ability. The investigators hypothesized that, “because the alphabetic writing system represents individual phonemes by letters, reading experience with the system should promote conscious phonological organization at the phoneme level” (p. 229). Cheung et al., could predict superior phonological awareness at the phonemic level in alphabetic readers, compared to non-alphabetic readers, although this area of research has shown that

reading experience in the form of alphabetic literacy strongly affected development of phonemic analysis, but only weakly influenced onset rimes. Thus, “in alphabetic languages the process of assembling phonology from letters relies on phonological awareness: knowledge of the sound structure of the language and the skill to manipulate sounds” (Holm and Dodd, 1995, p. 119).

Scandinavian Bilinguals. A somewhat unique study was done with Icelandic-Norwegian bilinguals, involved manipulation of verb characteristics and phonological coherence between the three languages of English, Norwegian and Icelandic. Ragnarsdottir, Simonsen, and Plunkett (1999) conducted this study mainly to see how morphological structure of the two languages made a difference in children’s systematic manipulations of verb characteristics. In discussing the grammatical structure of the syntax in English, Norwegian and Icelandic languages, authors explained that, English is identified as a language with relatively simpler morphology, whereas Norwegian as slightly complex and Icelandic as highly inflected morphologically. Three groups of children ages 4-, 6-, and 8 years old were included in this study. Cognates for past tense words were included in parallel experiments for the two groups of children. A picture elicitation task was used to have the children respond with the correct past tense form of the word to complete the sentence. Each child was tested individually on 60 verbs, presented in random order. Icelandic speaking bilinguals did not do as well as Norwegian bilinguals did, and results in this study led the authors to conclude that, “error patterns should be influenced by the phonological sub-regularities defining the different inflectional types and should also reflect the differences in correct performance on the different verb types at different ages” (p. 610). This difference in the languages

accounted for the differences in results of the groups of bilinguals in the experiments. The results from this study supported the rationale of Ragnarsdottir et al., “phonological factors like salience and segmentability” (p. 594), may be important as the two languages allowed for these factors being inherent in the morphological structure of the tenses in both Icelandic and Norwegian languages.

Arabic Bilinguals. In a study done by Abu-Rabia (1999) with Arabic speaking second and sixth grade bilinguals, children were asked multiple choice comprehension questions after reading Arabic texts. These children also knew Hebrew as a second language and English as their third language. Vowels (a phonological component) were identified as the units in Arabic orthography, which provide the phonological information, thereby providing the readers with specific meanings as well as specific pronunciations. Without distinct short vowels in written Arabic, it becomes difficult to “deduce” meanings of words. This study presented the observation that Arabic script is distinct from Latin orthography, the form that English language is written in and that as happened in this study the word recognition and reading comprehension was dependent on “an accumulation of bits of information, i.e., phonological information which facilitated word recognition and eventually provided with language comprehension. When tested in Hebrew language, children’s answers reflected “facilitation of phonological processing” (p. 97). This study also discussed the effects of context besides vowels as phonological units, both of which facilitated reading comprehension in the trilingual group of Arabic-Hebrew-English speaking elementary children. Therefore, for Arabic language, according to this author, “the contribution of phonological information by the vowels is a very important resource in word recognition in Arabic (p. 100).

Spanish Bilinguals. Francis (2002) tested Spanish-English bilinguals in his study, where bilinguals had to read a narrative from their first language and later were given specific tasks to correct grammatical and syntactic errors. Five measures of Literacy-related language proficiency included in this study as literacy measures were: reading, retelling, oral narrative, writing and effective editing/correction by second, fourth and sixth grade children. Obviously, reflecting on language requires production and this skill was more closely related to metalinguistic awareness than to reading (p. 384). The study also showed that, “the predictive capability of metalinguistic awareness seems to cut across grade levels only in relation to effectivity of corrections” (p. 386). As an important measure of literacy, metalinguistic awareness was found to be positively correlated with one literacy task related to written expression. This lends support to the model of Bialystok, as again attention to control and analysis mechanism seems to be at work when it comes to making sense of written text in a given language, as was the case in the Spanish-Bilinguals study just discussed above. Also, the focus on form of the text in their Native language Nahuatl, versus Spanish (L2) in which the written narrative was presented, provided further evidence that first language has cognitive implications for acquisition of and what I call “sense-making” in the second language. The study just discussed does indeed tap into the “*bilingual consciousness*” (p. 374) of the Spanish bilinguals.

Swiss Bilinguals. In a study done with Swiss-English bilinguals, Cromdal (1999) found that based on Bialystok’s model of analysis and control of attention, linguistic processing in Swiss-English speaking elementary grade bilinguals, high degree of bilinguality was evidential for development of linguistic analysis. This can be attributed

to the bilingual aspect of the group of children included in this study. Tasks included in this study were grammatical judgment, correction and symbol substitution between languages. The sub-group of proficient bilinguals did well versus partially bilingual group in identifying mistakes and correcting grammatical error in the adapted language – English (L2). Discussion of this study brought out a valid question: whether “bilingual children are forced to create various hypotheses about language structure, thus continuously elaborating on their linguistic knowledge” (p.18). More succinctly put, “Elimination of optional rules is therefore a step forward in learnability terms” (Roeper, 1999, p.170).

Greek Bilinguals. A study with 5-years old Greek monolinguals and bilinguals by Loizou and Staurt (2003) was done on their phonological awareness skills. The study had four groups: English-Greek, Greek-English (first language, second language orders), and monolingual English and Greek groups. In this study, bilingual children were given both Greek and English versions of the reading tasks. Children were matched on age, gender and verbal and non-verbal IQ s. Monolingual children were given phonological tasks in their native tongue. This study’s results show yet another facet of how bilingualism can have variation in its effect. The English-Greek group of children markedly outperformed the monolingual English children. Authors concluded that results from their study show that, “learning to read in an alphabetic language promotes this level of phonological awareness” (p. 3). Greek bilingual children did significantly better than Greek-English bilinguals on phoneme awareness task. The bilingual Greek-English did not have same results against Greek-speaking monolinguals, the reason being presence of “bilingual

enhancement effect”, which simply explains the findings in terms of better performance at a phonologically simpler language (case of English-Greek group).

French Bilinguals. Pettito (2003) presents a view of bilingualism from brain mechanisms’ standpoint. She makes an observation about the “translation equivalents” or TEs, in the languages that bilinguals possess. She presents a model of how brain-based processes make bilingualism a possible phenomenon in humans. In order for bilingualism to occur, an early linguistic development has to be present relative to monolinguals, noting that, “a child’s regular achievement of particular language milestone is key in early monolingual language development” (p.6). Furthermore she writes that, “The timing of the linguistic milestone in each of a bilingual baby’s two languages should be different if the neural mechanisms underlying human language acquisition are originally set to one language and similar if they are not” (p.46), meaning that in terms of brain’s function in language development, acquisition of two languages should follow similar developmental paths if languages do not introduce an actual change in the developmental trajectory of neural mechanism in case of acquiring ownership of more than one language. This concept had research implication of a grand magnitude.

To investigate further, Pettito devised a research study which involved 5 babies from 7-months to 2-years of age, 3 of whom learnt signed language besides learning their first language: French or English (exposure from birth). Two of the babies knew spoken languages only, and the rest were also learning LSQ-French (the sign language of Quebec). Children who were learning LSQ had parents who were hard of hearing. Pettito found that all of the bilingual children had language milestones within the range established for their monolingual counterparts in their respective native languages.

Videotaped transcriptions of what the children would say or refer to or show in sign language were analyzed for data for this study.

The rate and growth of the vocabulary of LSQ and spoken languages were similar in all of these bilingual babies over the study's duration. In case of neutral words, which did not have TE s, phonetic interference was observed in the production of different words with shared sounds across languages (p. 12). Thus, Pettito developed the Adaptive Phonological Differentiation (APD) model for bilinguals. This model states that very early on in life phonological processing begins and regardless of whether they become bilingual, babies have the rudimentary knowledge of phonetic inventory and knowledge of combinatorial and systematic regularities governing word-groupings, which later on, with the exposure of another language system, get activated.

Thus "each of the bilingual baby's input languages are also well in place by first word onset at around age-twelve months" (p.13). Due to the brain-based mechanisms, according to Pettito, the phonological representations get established early on.

The case of late-learning French-English bilinguals was established by Golato (2002). The idea of phonological knowledge being scaleable across languages holds true, implicating that due to the similarity in the two languages, late-learners of French language could do well on syllable monitoring task in this study. Older French-English bilinguals were tested on their ability to identify correct number of syllables in both languages. In late-learners, no delay in fluent syllable identification was noted, leading to the conclusion that due to similarity in French and English language structures, late-learning of French language did not necessarily mean faulty understanding of L2. Haritos & Nelson (2001) also presented the idea that, "it appears that the type of link, namely

lexical and/or conceptual, between each of a bilingual's languages, as well as its strength, depends upon the degree of L2 fluency" (p. 419).

SUMMARY AND CONCLUSION

Conclusion. From this review three main points to remember are these: a) Phonological awareness, as a metalinguistic skill is important in the development of a second language in bilinguals. b) Early language acquisition of L2 will be facilitated by phonological instruction in elementary grades and c) Language systems' similarity in structure is a considerable factor in reading and comprehension tasks in literacy learning, in case of bilinguals.

In summary, we should note that one's awareness of the sound structure of L1 language is crucial for bilinguals to adeptly read, and make sense of what is read. As research has shown, spoken language has a direct effect of phonological processing ability in case of bilingual children. That leads to the premise that fluency in L1 will lead to better grasp of L2, in most cases.

Scholes (1997) advances the idea that, acquisition of literacy by children (and adults) plays no favorite. The grammar of the orthography of English is not like that of any spoken dialect. No parallel speech will enable a child to become aware of phonemic segments or affixations or word boundaries or metathesizing transformations – these are acquired through exposure to reading and writing, and the lack of literacy favors no ethnic, geographic of socio-economic oral environment (p. 13).

In concurring with this assertion, my proposed solution to obstacles in research on bilingual language acquisition and literacy learning is that we must take into consideration the permutations within bilinguals due to language differences.

Furthermore, Orthographic differences in writing systems are significant factor in acquisition of L2 and understanding and speaking of L2, as was seen in case of bilingual Chinese children. Certainly phonological awareness as a metalinguistic skill is crucial to development of a bilingual mind, yet there is more to be explored in this area of language acquisition.

In this review, I included multiple studies consisting of various languages, and different sets of bilinguals, because I aimed to understand the impact of a specific phonological awareness skill, as it contributed to and not contribute to bilingual advantage across languages. Thus, the questions that I posed in the beginning of this review are partially addressed now.

Literacy learning is just as important for everyone regardless of how many different languages one might know how to speak. The task of researchers in language and educational research domains is to identify commonalities as well as differences that occur naturally due to speaking more than one language. Classical theorists such as Piaget and Chomsky, in developmental and linguistic fields, were rather limited in the span of their sciences, as they did not consider bilingualism in language development.

Today, consideration of bilingualism is imperative due to increasing multilingualism. So, as research models are converging from cognitive to linguistic to educational practices for bilinguals with more and more emphasis, on phonological training in curricula, especially for English language Acquisition (ESL), no one particular

model may be right in answering all of our questions related to the advanced stage of meta-linguistic skills.

Recommendations for Future Research. In order for further confirmation of the positive effects of phonological awareness on the reading ability of bilinguals to be explored fully, future research studies in the area of bilingualism and literacy learning should focus on discriminating the variations and the variants of bilingual levels; the effects of writing structures or orthographies of alphabetic or character languages. Most importantly, longitudinal studies should be conducted to assess the long-term gains of phonological awareness, as one metalinguistic skill, on the bilingual children's language proficiency, comprehension and continued literacy in the second language.

The ultimate goal of this thesis was to gather insights into development of language skills in bilinguals and through this exercise present research findings from the domains of language and cognition studies to understand ways in which bilinguals obtain language acquisition skills and consequently achieve normal levels of proficiency in second language acquisition and literacy learning.

Future research in the areas of bilingualism and language development from cognitive and linguistic perspectives should be conducted from an eclectic approach where multiple models are applied. Bilinguals from differing language groups could be given the same measures to assess their phonological awareness skill level, including tests for different aspects of phonological awareness, while controlling for SES, literacy levels of the families, the quality of bilinguals' educational and academic experiences, as well as age. The use of such meta-linguistic skills as phonological awareness can greatly

help young bilingual readers and they can realize their educational and communicative aspirations and fully benefit from their cognitive skills and language abilities.

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