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Research Article

A Correlational Study - Literacy Skills and Phonological Skills in Children 4-10 Years Attending Mainstream Schools in Karachi, Pakistan

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Abstract

Phonological awareness (PA) is the foundational reading skill, since it involves the identification and manipulation of non-lexical speech components including syllables, rhymes, and phonemes. The early phases are critical for the acquisition of emergent literacy abilities necessary for a smooth transition into academic reading. Three domains related with developing literacy that play an essential role in reading acquisition are phonological knowledge, print understanding, and oral language development. Poor Phonological Awareness can be used to define children that do not learn speech sounds in the typical way. These children fail to comprehend both sound system as well as the regulations that regulate speech. This skill is learnt rather simply; yet, folks with low phonemic awareness will pronounce particular sounds correctly in specific words but fail to make the very same sounds in others. This research is important since it will help to close a knowledge gap in this area. This article makes the audience aware that establishing a child's phonological awareness is vital because of its strong association with phonics, it is significantly tied to early reading and spelling success. This is a study done for 385 people for a time period of two months by the researcher who will employ convenient sampling strategy for data gathering. A sample size of 384 is based on the central tendency technique to guarantee a confidence of 95%. Data collection helps researchers to maintain and analyze crucial information on their current subjects. In compared to in-person data collecting, digital data collection provides significantly bigger sample sizes and boosts the data's accuracy. The study indicated that the reading participants were from a wide variety of ages. This clearly proved that the study was done on a diversified sample of participants at all levels. Pearson correlation was performed to analyze the link between the PAST and Reading scores. The strength and direction of a relationship may be evaluated using correlation.

PAST and Reading score have a substantial direct association, as indicated by the correlation value of 0.891.

Keywords: Phonological Awareness; Phonemes; Reading; Literacy; Correlation; PAST

Abbreviations

PAST: The Phonological Awareness Screening Test

Introduction

The cornerstone for all other reading skills is phonological awareness (PA). "Phonological awareness is the ability to detect and modify sub-lexical speaking components such as syllables, rhymes, and phonemes", (Gillon, 2002; pp. 3). This definition has been modified by (Foy and Man, 2006; pp. 3) to include "letter - sound knowledge that relates to the connection between graphemes and phonetic symbols of a language". Simply put, phonological awareness is the ability to perceive the sound pattern in words" (Kilpatrick, 2015; pp. 6). When children do not master PA, their development in the other fundamental reading

components suffers. In Pakistan children in the middle- and upper-class society are relatively thriving because they still get to speak English at home and school. Additionally, children from a lower socio-economic background do not have these opportunities and neither are their curriculums ensured of teaching phonological skills, print awareness or speech and language skills which puts them at greater risk for failing at acquiring literacy skills.

The early stages are essential for the formation of emergent literacy abilities necessary for a seamless transition into academic reading. Three domains connected with emerging literacy that play an important role in reading acquisition are phonological knowledge, print understanding, and oral language development. One of the Preliteracy skills that is helpful for understanding to read a language is phonological awareness (Pullen and Justice, 2003). As the child knows orthographic disparities, phonological awareness develops from preschool to second grade. There are four degrees of phonological awareness development: word, syllable, onset-rime, and phonemic awareness. According to the findings, difficulties with phonological awareness and phonology skills are a predictor of poor language learning development [1].

Children who struggle with academic skills, particularly early reading and writing tasks, show an underlying impairment described as persistent poor phonological awareness (Larrivee, L.S. and Catts, H.W., 1999). Poor Phonological Awareness can be used to characterize children that do not develop speech sounds in the traditional way. These children fail to understand both sound system as well as the laws that govern speech. This skill is learned relatively readily; nevertheless, persons with poor phonemic awareness will pronounce certain sounds correctly in certain words but struggle to generate the very same sounds in others (Bowen, 2011). Print awareness and handwriting proficiency can also be regarded as good indicators of memorizing vocabulary and how effective the client is at spelling correctly (Anthony., *et al*. 2011). Although PA is a deep level of meta-phonological knowledge, children as young as 3 years of age are able demonstrate this awareness

(Chaney, 1992; Maclean, Bryant, and Bradley, 1987).

Phonological awareness

It refers to the acoustic analysis and manipulation of language via rhyming, segmentation, isolation, deletion, substitution, and blending. It refers to the ability to alter and evaluate bigger phonological components, such as rhyming and blending syllables, at the word level. Phonological Awareness is the ability to examine and manipulate the constituent sound units (phonemes) within a word at the phoneme level, or phonemic awareness (Degé and Schwarzer, 2011; Eccles., *et al*. 2020). Phonological awareness, which includes more complex phonemic awareness abilities, is the foundation of phonics understanding. Phoneme-grapheme matching and phonemic decoding are early literacy skills that rely on phonics and necessitate the intricate audio-visual synthesis of phonemes. When these skills in literacy programs do not focus on PA as they should we start seeing residual difficulty in the later stages and older grades? This is of concern especially for a bilingual society which is already finding it difficult to educate students at a subpar level. For each child to be successful in a second language, greater emphasis needs to be added and given by educators to cater to basic foundational skills such as PA which is often over looked in the curriculums in Pakistan. Reading skills grow as a result of PA and phonics understanding (Kilpatrick, 2015). Music teaching has been found in numerous research and systematic reviews to increase PA and early literacy abilities in young kids (Bhide, Power, and Goswami, 2013; Christiner and Reiterer, 2018) this method is globally used for children younger than 5 years of age to build PA. Findings showing the link among pitch and rhythm discrimination and PA and reading abilities in younger children, on the other hand, have produced mixed results (Patscheke, Degé, and Schwarzer, 2019). Musical pitch discriminating was found to predict both phonological and reading skills in primary school children, whereas rhythmic identification only predicted reading skills (Forgeard., *et al*. 2008). According to certain research, more exposure to music training is connected with better increases in PA and early reading ability (Heagy, 2018).

According to a study done in Pakistan, the rate of speech - language deficits in preschool children ranges between 2% and 19%. According to the findings of this study, “69 percent of the sample of 200 had language difficulties, whereas 31 percent had speech sound issues” (Arshad, H., and Ghayas, 2013; pp. 229). The proportion of speech sound abnormalities in Pakistan was determined in a second cross-sectional investigation. The data obtained with N = 377 stated a prevalence of 1.3 percent among elementary school children (Aslam, 2020). Children who have phonological processing deficiencies (PDD), which have difficulties understanding all stages of linguistic structure, particularly consonants and rimes. Individuals with language or reading

issues, on the other hand, often develop the ability to recognize these bigger linguistic units with age, but they remain oblivious to syllable-internal phonological structuring (Pennington, Van Orden, Smith, Green, and Haith, 1990). (Mann and Foy 2003, p. 151) demonstrate a complicated link between phonological language processing perceptions.

Because both phonological knowledge and speech perception rely on a shared internal state of phonological structuring, the integrity of language comprehension should be linked to the reality of phonological awareness. Perception necessitates the linking of information given by the speech signal to some concept of internal phonological presentation; comparing or manipulation of particular elements of a syllable or word necessitates the use of some way of internal representing phonological structures. It is necessary to acquire phonological awareness abilities in order to build effective reading skills. Learning to control sounds and words, or to play with words and sounds, requires high phonological awareness abilities (Knobelauch, 2008). Because no previous study on the relationship between phonemic awareness and literacy on bilingualism in the Pakistani population has been conducted, it is critical to collect data that will contribute to the development of standardized tests to detect and begin involvement in a timely manner.

The capacity to notice distinctions and similarities in linguistic sounds (such as rhyming and alliteration) rather than its meaning is referred to as PA. For L1 English learners, the association between PA in preschool and reading in the first several years of schooling is very robust [2]. PA has been found to have a causal link with English reading acquisition out of all the components associated with reading development (Scarborough 2001). PA often increases as children improve their oral-language proficiency (Snow, Burns, and Griffin 1998). In fact, children may require a bigger vocabulary to discern sharper differences between sounds (Walley, Metsala, and Garlock 2003). Many studies suggest that L2 learners have lower receptive and expressive vocabulary scores than L1 norms (e.g., Gottardo 2002; Miccio., *et al*. 2005) or L1 speakers (e.g. Chiappe and Siegel 1999; Gathercole and Thomas 2009; Gathercole, Thomas, and Hughes 2008; Pearson 2009). L2 learners may be disadvantaged in establishing PA in their L2 due to a lack of vocabulary. Some, on the other hand, believe that learning two languages improves a bilingual child's PA (e.g. Yelland, Pollard, and Mercuri 1993).

Several studies, however, suggest that English L2 learners (ELLs) from various L1 backgrounds have equivalent levels of English PA to their L1 English peers (Bialystok, Majumder, and Martin 2003; Geva, Yaghoub-Zadeh, and Schuster 2000; Muter and Diethelm 2001). Bialystok, Majumder, and Martin (2003) discovered that bilinguals and monolinguals did not differ on most PA measures; however, on phoneme segmentation, Spanish English bilinguals outperformed English monolinguals, whereas Chinese English bilinguals outperformed English monolinguals. Thus, the specific language pair and/or phonology and orthography features of a bilingual's two languages may influence the child's PA development. PA has been shown to be a strong predictor of L2 learners' English word reading skills (Durgunoglu, Nagy, and Hancin-Bhatt 1993; Geva, Yaghoub-Zadeh, and Schuster 2000; Gottardo 2002; Muter and Diethelm 2001; Quiroga., *et al*. 2002), and studies in the United States and Canada found no difference in the power of PA to predict word-level reading between English-only learners and ELLs, As a child's brain development matures and displays the critical phases of literacy development, their reading and writing abilities will enhance. Emergent literacy, alphabetic fluency, words and patterns, intermediate reading, and advanced reading are the five stages of literacy development. Each level of literacy development assists the child in moving ahead and developing into a more capable learner. Nonetheless, the child's present age group does not always correspond to their stage of early literacy development. Emergent literacy is the first stage of literacy development. Early literacy skills, including as letter recognition, decoding skills, and print knowledge, have been linked to successful reading acquisition. Letter recognition is the single best predictor of eventual reading success for L1 English speakers among these diverse skills (Adams 1990; Scarborough 2001; Vellutino and Scanlon 2001). It occurs when a child learns to grasp letters and words. While many of the emergent literacy stage's activities are undeveloped and sporadic, they are nevertheless early indicators that a child is developing literacy skills. As a child matures and gains confidence in their ability to learn their words and letters, they progress to the alphabetic fluency stage of literacy development. The words and patterns stage, often referred to as the "transitional" stage of literacy development, is when children begin to gain greater reading abilities. This is the moment at which children exhibit the greatest range of abilities and may exhibit characteristics associated with various stages of literacy development. Children begin to rely less on educational

crutches that aid in the acquisition of new words throughout the intermediate stage of literacy development. This is also the stage at which children begin to compose sentences correctly and drastically improve fluency. Advanced reading, as the final stage of literacy development, occurs when children become fully fluent and capable of learning new knowledge only via independent reading. Reading and writing are not difficult at this stage, and pupils can grasp complicated reading materials.

Children who can recognize more letters of the alphabet in kindergarten are more likely to become successful readers later in life (Scarborough 1998). Word recognition; is a powerful predictor of later reading comprehension by the first grade (Juel 1991). For example, one meta-analysis of 49 different samples discovered an average association of 0.74 between word identification and reading comprehension (Swanson., *et al*. 2004). According to Paez, Tabors, and Lopez (2007), ELLs in the United States performed poorly on oral language and literacy skills as compared to monolingual standards, but performed better on literacy than oral language skills in prekindergarten. Another study found no statistically significant differences in English wordlevel reading between ELLs and L1 speakers at the start of first grade (Geva, Yaghoub-Zadeh, and Schuster 2000). Nonetheless, according to the international progress in reading literacy study (PIRLS) 2006, Singaporean fourth-graders outperformed US pupils in English reading (Mullis., *et al*. 2007). Despite their logographic reading training, questions unanswered were do Singaporean kindergarteners begin with great word identification skills? Or does their progress quicken after they begin formal schooling?

The level of phonemic awareness that children possess when first beginning reading instruction, as well as their knowledge of letters, are the two best predictors of how well they will learn to read during the first two years of formal reading instruction, according to the National Reading Panel Report (National Institute of Child Health and Human Development, 2000). According to the 2003 National Assessment of Educational Progress (NAEP), 37 percent of fourth graders and 26 percent of eighth graders are unable to read at the basic level, while 26 percent of twelfth graders are unable to read at the basic level on the 2002 NAEP. That instance, while reading grade-appropriate content, these pupils are unable to extract the general meaning, make evident connections between the text and their own experiences, or draw basic inferences. In other words, they are unable to comprehend what they have read. National Assessment of Educational Progress (NAEP) (NAEP). Based on the findings of this and other studies, it is critical that early childhood educators comprehend the importance of both phonological and phonemic awareness skills.

Print knowledge is a broad word that incorporates children's print conceptions as well as their alphabet knowledge (Justice, Bowles, and Skibbe, 2006). As a result, this phrase usually refers to one's comprehension of the forms and functions of written language, as well as of letters and their related sounds. A range of tasks can be used to test children's print knowledge, including understanding of book reading rules, letters and their associated sounds, the links between written and spoken words, and abstract concepts related to literacy (e.g., word, sentence, reading). Although the skills included under the heading of print knowledge have traditionally been measured independently, there is evidence that they are linked and are components of the wider concept of print knowledge (Justice and Ezell, 2002; Lomax and McGee, 1987). Print knowledge is related to phonological awareness; yet, there is evidence that it is a fundamentally different phenomenon (Burgess and Lonigan, 1998; Lonigan, Burgess, and Anthony, 2000). Furthermore, each construct predicts the likelihood of eventual reading difficulties in a distinct way, showing that a deficit in each of these domains may put a kid at risk for limited literacy achievement (Catts, Fey, Zhang, and Tomblin, 2001). Prior to the start of formal literacy education, the child develops print knowledge by interacting with print in everyday situations (Mason, 1980; Sulzby, 1985; Vukelich, 1994).

This exposure occurs in a variety of contexts, such as at the breakfast table when parents attract their child's attention to the cereal box label, during adult-child book reading interactions, and through educational television programming aimed at alphabet knowledge (Bus, van IJzendoorn, and Pellegrini, 1995; Foy and Mann, 2003; Minton, 1975; Neuman, 1999; Neuman and Celano, 2001). Children's knowledge of letter names and sounds is expanded through formal education and practise with the alphabet (Ehri, 1987). For preschool-age children with typically developed language skills, relationships between oral language and print knowledge have been documented (Chaney, 1994; Dickinson, McCabe, Anastasopoulos, PeisnerFeinberg, and Poe, 2003; Justice., *et al*. 2006). Furthermore, it has been demonstrated that preschool-

age children with NH who have linguistic deficits suffer delays in print knowledge acquisition (Boudreau, 2005; Catts et al., 2001; Gillam and Johnston, 1985).

Materials and Methods

The research will be conducted in middle to high income mainstream English - medium schools in Karachi, the largest cosmopolitan city in Pakistan. This is a Cross-Sectional study conducted to establish an association between phonological awareness skills and their correlation with literacy skills (Reading) developed by children during the ages of 4 to 10. Data was included for a side-by-side analysis. Students were first assessed using PAST to assess for Phonological Skills. Phonological Awareness Screening Test (PAST) (David A. Kilpatrick, Ph.D), adapted from the levels used in (McInnis, 1999) and (Rosner, 1973) which consists of 4 domains with subtests where each subtest consists of six items. The domains are based on blending sounds, segmentation of sounds and syllables, and deletion of sounds and syllables (phonemes in words) and substitution of sounds (Manipulation of phonemes). The PAST has been administered to achieve natural confound of test-retest reliability and alternative form reliability. The studies showed very strong correlations among all the measure of Literacy, (Kilpatrick. A, 2008). PAST offers educational evaluators and researchers a tool that typically correlates more strongly with word-level reading and phonics skills than most phonological awareness assessments in current use.

These Variables of Phonological Skills will then be correlated with Reading Skills to assess successful Literacy skills in the child, the test used to assess reading skills is The San Diego Quick Assessment of Reading Ability used for children between Kindergarten and Grade 11. This test measures reading accuracy of words out of context which gives an accurate or more reliable score on how well a reader is being able to decode and code words given out of context. This test is quick to administer and is commensurate with the Pakistanis schools of English medium curriculum. It is an excellent tool to measure accurate grade level literacy skills (Reading) and has been tested on over 10,000 children in the Pakistani schooling system. Furthermore, is has been established to have robust repeatability criteria. This data collection will be entered in SPSS so a side by side analysis can be conducted for each participant/study subject and the strength of association can be highlighted. The population of the study will comprise Pediatric, consisting of bi/multilingual children between the ages of 4-10 years attending middle- and high-income English-medium mainstream schools in Karachi, Pakistan.

The sample size was calculated using the Formula for Prevalence.

On 50 % prevalence, using the formula

$N= z2p(1-p)/d2$

$(1.96)2(50)(1-0.50)/(0.05)2 = 385$

Sample size: 385.

This is a study conducted for 385 subjects for a time period of two months by the researcher who will use convenient sampling technique for data collection. A sample size of 384 is based on the central tendency method to ensure a confidence of 95%. Data collection enables researchers to keep and evaluate critical information on their current subjects. In comparison to in-person data gathering, digital data collection enables far greater sample sizes and increases the data's accuracy. Likewise, the primary goal of data collecting is to ensure that sufficient information-rich and accurate data is gathered for statistical analysis so that data-driven research recommendations can be undertaken.

Samples will be selected by simple random sampling Technique. Subjects will be chosen from 5 different education institutes based on meeting this study's inclusion criterion and will be assessed in two phases. Phase 1 comprises of data collection using the PAST to test for Phonological Skills and data collected from the San Diego Quick Assessment of Reading Ability to test for reading skills. Once informed consent is provided by the study subject's guardian and the participating educational center. Phase 2 will commence once this collected data is logged into SPSS for each subject. Upon completion of the required data in phase 1, data analysis will be conducted to identify the association of Literacy Skills and Phonological Awareness based on their performances on both the tests conducted.

Age	Frequency
4-5	82
5-6	52
6-6.5	54
6.5-7	76
7-8	53
8-10	70

Table 1: Respondents profile.

Figure 1: Age Distribution of the respondents.

Results and Discussion

This study measured education and grade level distribution, reading score frequency, graphical representation of student score, Pearson Correlation between PAST SCORE and Reading score. The below Table 2 shows a similar set of respondents in each level of education showing that all levels had more or less equal representation. The figure shows the individual education level at which the participants fall. The graph shows that the reading participants fall in all diverse levels pertaining to the grades that the samples were taken from. Starting from Pre-K all the way to Grade 4 This shows that the study was done on a diverse set of participants falling in all levels making the study more meaningful due to a more inclusive and representative sample which further supports the generalizability of the research.

Level		
Particulars	**Frequency**	**Percent**
6	70	18.1
4	76	19.6
2	52	13.4
3	54	14.0
1	82	21.2
5	53	13.7
Total	387	100.0

Table 2: Education Level Distribution of the respondents**.**

Figure 2: Grade Level Distribution of the respondents.

Figure 2 shows a similar set of respondents in each level of education showing that all levels were equally studied. Level of education being the grades that they are enrolled in.

- being Pre - K
- being Kindergarten
- being Grade 1
- being Grade 2
- being Grade 3
- being Grade 4

Figure 3 shows the individual Reading scores and the percentage of the respondents who fall within the scores. The graph shows that the reading score is mostly weighted at reading well with 63.57% of the participants falling under the reading age appropriately category while 36.43% lies in the not reading age appropriately strata. The Reading Scores were taken from the Sandiego Test of Reading Measure Tool.

Figure 3: Reading score frequency.

Graphical Display of the Students' scores

Box Plot - PAST Score and Reading Scores

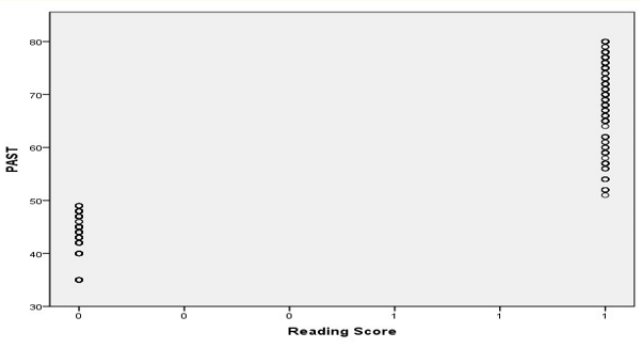

Figure 4

The box plot shows the flow of the data. It is used to see if the data is compressed on one side, or scattered over a larger distance. The above graph shows that the Reading score was binominal in nature (0 - 1) hence is seen on two reading on the x-axis. The Y-axis sees the past score that was between 0 to 100 hence a more diverse distribution on the Y-axis.

Correlations			
		PAST SCORE	**Reading Score**
PAST SCORE	Pearson Correlation	1	.891**
	Sig. (2-tailed)		.000
	N	387	387
Reading Score	Pearson Correlation	.891**	1
	Sig. (2-tailed)	.000	
	N	387	387

Table 3: Pearson Correlation between PAST SCORE and Reading score.

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

Pearson correlation was used to test the correlation between the PAST SCORE and Reading scores. Which ultimately shows significance between PA and reading skills. Correlation is used to test the level of association between two variables by identifying the direction and magnitude of the relationship. The correlation value of 0.891 shows that there is a strong direct relationship between PAST SCORE and Reading score (compared to a p value of <1 and a positive value). The sig value of 0.000 is less than 0.05 showing that the correlation is statistically significant (compared to a p value of < 0.05 being statistically significant and one od <0.01 having an even higher level of statistical significance) having a direct strong relationship, showing that if PAST score are high, the Reading Score will also be high, and vice versa. Keeping this in mind, we fail to reject the hypothesis (H1: PAST SCORE and Reading score have a significant correlation).

The Pearson correlation was conducted because the data was normally distributed and fit for parametric analysis. The Pearson correlation value of 0.891 between reading score and PAST score shows a strong direct correlation between these two variables. The (*) signs next to the Pearson correlation value of 0.891 show that the data was statistically significant. The sig value of 0.000 shows that the value is less than 0.05, which shows that this correlation is statistically significant meaning there is a significant association between the two variables. The cut-off point of the sig value for management sciences and social sciences is 0.05, which shows an accuracy of 95% in the results hence the study`s result were analyzed keeping these standards in mind. The result shows a strong significant direct correlation between PAST Score and reading scores, which means an excellent PAST SCORE result would lead to positive reading scores [3-10].

Conclusion

The study demonstrated that the reading participants come from a wide range of ages. This clearly demonstrated that the study was conducted on a varied group of participants at all levels. Pearson correlation was employed to examine the relationship between the PAST and Reading scores. Correlation is used to assess the degree of a link between two variables by determining the magnitude and direction of the relationship. PAST and Reading score have a significant direct link, as evidenced by the correlation value of 0.891. The association is statistically significant because the sig value of 0.000 is smaller than 0.05. Bear this in view, we cannot reject the hypothesis and can conclude that there is an essential link between PAST and Reading score. We can conclude through the Results that PA skills and Reading Skills are positively correlated in the subset population of bilingual children attending middle- and upper-class mainstream schools via conducting a phonological awareness test and a reading test and then using the Pearsons Corelation test to integrate the results in SPSS software.

The developmental, psycholinguistic perspective on phonological awareness does indeed have implications for phonological awareness evaluation. It can aid in spotting intellectually significant cognitive and attainment shortcomings. So, it can indicate proactive management to avert curriculum design and instruction. A test that spans numerous levels of language difficulty or multiple levels of task complexity, or both, should be conducted to determine phonological awareness maximally. While all tests tend to evaluate phonological awareness, the most relevant and dependable estimates of competence will be given when there is a match between the specific phonological awareness abilities evaluated and the stage of phonological development of a confident youngster. Optimum evaluation would aid early identification of children at risk for reading comprehension problems, educational diagnosis, instructional design, and resource allocation. Another exciting component of our extensive but unified developmental perspective of phonological awareness is that young children at risk for reading challenges can be provided developmentally appropriate assistance long before they struggle with learning to read.

Likewise, intervention studies with pre-readers have demonstrated that phonological awareness training, especially when combined with letter knowledge education, results in long-term phoneme awareness, reading, and spelling improvements. Finally, the developmental, psycholinguistic conception of phonological awareness makes it clear those specific phonological awareness abilities, spelling patterns, and word-reading approaches may be more effective if integrated and taught in a systematic, developmentally sensitive sequence.

This study aims to measure PA that could be used by children who had an educational purpose of speech and language deficiency within their schools. This study has few limitations that can be answered by future studies. Firstly, this study measures PA by small population not specified, future researcher can use another sample size like specify children category such as who are deaf or any kind of disability. This study focused only Pakistani schools; future researcher can choose different schools of outer countries or categorize Pakistani schools by cities and their level of position. Future studies can compare high - and low-level schools for phonological awareness.

The limitations of the study are as follows: selection bias specifically the Berkson Bias because the study is centered on middle to high income schools only/there by middle to high socio-economic status. The tests conducted were not normed on the Pakistani population. There were no formal language assessments conducted to rule out any speech and language communication difficulties.

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