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The Relationship between Phonological Awareness and Early Reading for First Grade Korean Language Learners with Reading Difficulties

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This study investigated the differences in four components of phonological awareness (i.e., judgment, deletion, blending, and substitution) and early reading ability across reading levels, and the correlation between phonological awareness (PA) and early reading ability in low and average-achievement groups. 27 students with reading difficulties and 34 students with average reading abilities participated in the study, and all participants were native Korean students in Grade One. The results indicated significant differences between low-achievement and average-achievement groups in PA and early reading measures, which revealed features of Korean phonology as different from English. Furthermore, phonological awareness showed significant positive correlation with both word identification and reading fluency for the low and average-achievement groups. For the low-achievement group, the correlation between phonological awareness and reading fluency was higher than between phonological awareness and word identification.

Key words: phonological awareness, early reading, word recognition, reading fluency, low achievement

"Phonological Awareness (PA) refers to one's awareness of and an access to the sound structure of oral language." (Wagner, Torgesen, Rashotte, Hecht, Barker, Burgess, et al., 1997, p. 469) PA is the ability to segment a word or syllable into small units and individual sounds and the ability to blend the unit of sound into a syllable or word (Wagner et al., 1997). The research literature has reported that PA is one of the best reading predictors for students with reading difficulties (National Reading Panel [NRP], 2000). Experimental studies have identified the positive relationship between PA and word-level reading (Wagner et al., 1997). Meanwhile, continuous intervention research of PA during the past decade has shown mixed results on the influence of PA in increasing reading performance by duration of intervention (Jenkins & O'Connor, 2002). However, results of follow-up studies and meta-analysis has established that (a) PA skill is directly associated with reading ability; (b) although the relationship is bidirectional, the development of PA precedes word identification; (c) PA is a reliable predictor of later reading ability; and (d) intervention for PA, coupled with instruction in specific letter-sound relationships, accelerates word decoding skills (NRP, 2000; Wagner et al., 1997).

The findings on the relationship between PA and later reading skills are in need of more developed research. First,

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further research is needed to investigate the specific components of PA that have a higher relationship with early reading skills, including judgment, deletion, blending, and substitution. Although previous research has addressed some of the components of PA with an interest in reading development of children with reading difficulties, the research was conducted with English language learners. However, the difference of language structure between Korean and English requires research on native speakers of Korean and the PA variables of the Korean language. Sprugevica and Hoien (2003) found that previous studies focused on the correlation of PA and word decoding rather than on reading fluency and comprehension. They suggested considering reading fluency, as well as word identification, as early reading skills, in that reading fluency is a bridge to reading comprehension and that word recognition is a prerequisite for reading fluency. Their research thus included both word recognition and reading fluency as variables of early reading abilities.

This study examines the differences in PA components across reading levels and the correlation between PA and early reading (i.e., word recognition and reading fluency) for both a low-achievement and an average-achievement group of Korean students. The goal of this research is to clarify the importance of PA in early reading skills for struggling readers. The results of this study will provide a guideline to develop measures for early identification of low achieving students by exploring factors that are not recognized by traditional standardized tests.

Method

Participants

Two elementary schools in an urban area in Korea participated in the study. Student participants were 27 children with reading difficulties and 34 children with average reading abilities. The criteria for selecting participants were as follows: (a) all students were in Grade One; (b) students who scored at least one standard deviation below their grade level were identified as the low-achievement group and students who scored at the average level were identified as the average-achievement group, as measured by the Achievement-Cognitive Ability Endorsement Test (ACCENT), the Korean language test for the lower graders (Kim & Shin, 2003); and (c) both low achievers and average achievers received reading instruction together in the general classroom.

Measures

PA measure. The research team developed the measure of PA on the basis of the Phonological Awareness Literacy Screening (Swank et al., 1997) and Mann's (2003) PA classification system. This measure included four subtests—judgment, deletion, blending, and substitution—and each subtest consisted of two levels: syllables and phonemes. The measure consisted of constructs and items sensitive to the characteristics of the Korean language; for example, the measure excluded a segment section, because, in Korean, one syllable is expressed as one cluster formed by two or three letters, while in English, one syllable is arranged in line by several letters. The PA was administered as follows:

- Phoneme judgment: children listened to three words and found one word that started or ended with a different phoneme than a target word.
- Phoneme deletion: children were asked to say a word, then to say the word after deleting either the initial or the final phoneme.
- Phoneme blending: children listened to a series of phonemes and were asked to say the word that resulted when the phonemes were blended together.
- Phoneme substitution: children were asked to say a word, then to say the word after substituting the initial or the final phoneme.

Word identification measure. The word recognition test measured the word-decoding ability of students. This measure consisted of the students hearing a high-frequency word, a low-frequency word, and non-word. Each category was then divided into two sub-categories (i.e. regular and irregular words). This measure used two-syllable words that were identified in Kim's Korean word frequency scale (2003).

Reading fluency measure. The reading fluency test measured the amount of correct words that students could read in one minute using a standardized reading test, the Basic Academic Skills Assessment: Reading (Kim, 2000).

This test measured both accuracy and speed of reading.

Procedure

Using the ACCENT test (Kim, Lee, & Shin, 2003), the research team selected a group of low achievers and a group of average achievers. PA, word recognition, and reading fluency measures were individually administered by trained research assistants over the course of three weeks. For the high fidelity of the administration of measures, students were randomized to each research assistant and the test order was also randomized.

Analysis

First, a t-test analysis was performed to investigate the differences between low achievers and average achievers on PA, word recognition, and reading fluency outcome measures. Next , the correlations of PA, word recognition, and reading fluency of each reading skill level were examined using Pearson's correlation coefficient.

Results

Differences in PA across Reading Levels

The t-test was performed in order to examine the differences in PA between the low and average-achievement groups. The descriptive statistics, including mean and standardized deviations, were then investigated. The results are presented in Table 1.

All results of the t-test on the PA of the low-achievement group and the average-achievement group were significant. The scores on PA tests showed that the average-achievement group outperformed the low-achievement group. The total PA scores showed a significant difference between low- and average-achievement groups, t=6.27, $p<.01$. For the PA subtests, all scores were significantly different: judgment scores, t=4.87, $p<.01$, deletion scores, t=4.86, $p<.01$, blending scores, t=5.76, $p<.01$, and substitution scores, t=6.04, $p<.01$. Thus, compared to the average-group, the low-achievement group showed a significantly lower performance on all four subtests.

The percentile scores for each test are presented in Figure 1 and Figure 2 in order to analyze the relative performance rates for each PA subtest compared to the total score of PA. For the mean of each subtest, the low-achievement students gained a mean score of 4.81 of a total score of 10 on the judgment test; 6.40 on the deletion test; 5.74 on the blending test; and 4.52 on the substitution test.

In comparison to the overall performance level, the low-achievement group generated 64.8% and 57.4% for the deletion and blending tests, respectively, showing a relatively higher level of performance when compared to results in the judgment and substitution tests.

On the other hand, the average-achievement group showed different results. In 10 questions on each subtest, the students gained the mean average score of 7.62 on the judgment test, 8.94 on the deletion test, 8.97 on the blending

Table 1
Descriptive Statistics and t-test of PA for Average- and Low-Achievement Groups

	Group				Difference in mean score	*t*
	Low Achievement		Average Achievement			
Measure	*M*	*SD*	*M*	*SD*		
Total	21.63	8.50	33.53	5.62	11.90	6.27**
Judgment	4.81	2.37	7.62	2.12	2.81	4.87**
Deletion	6.48	2.42	8.94	1.15	2.46	4.86**
Blending	5.74	2.57	8.97	1.55	3.23	5.76**
Substitution	4.52	2.55	8.00	1.95	3.48	6.04**

Note. $^{**}p < .01$

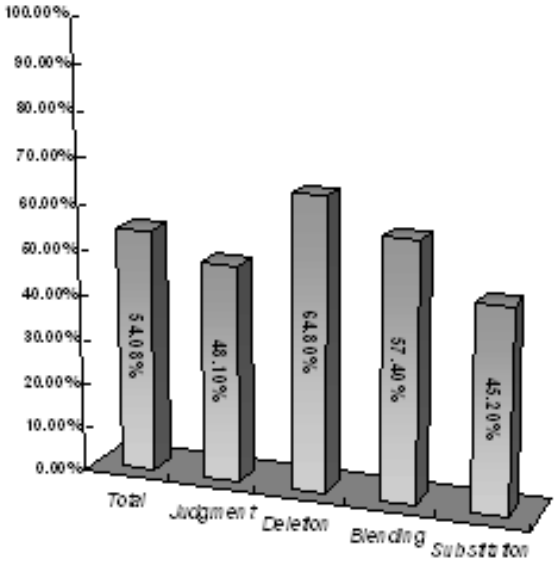

Figure 1. The pattern of performance in PA for low achievers

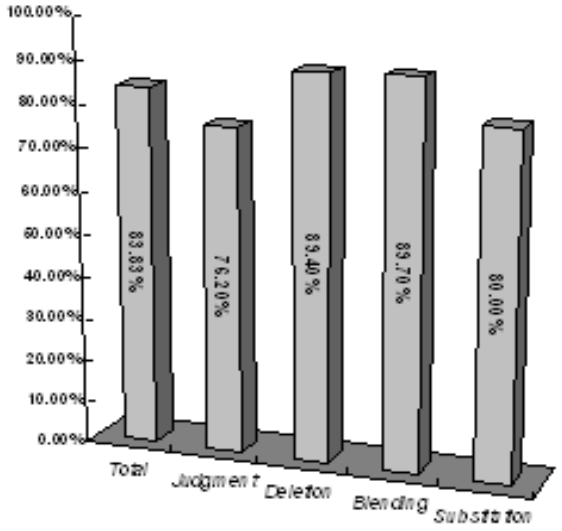

Figure 2. The pattern of performance in PA for average achievers

test, and 8.00 on the substitution test. The group also showed a higher level of performance on the deletion and blending tests, 89.4% and 89.7%, than on the judgment and substitution tests, 76.2% and 80.0%, respectively. The performance of average-achievement students was approximately 90% in the deletion and blending tests. Thus, it was concluded that students who develop average reading skills would be able to perform deletion and blending subtests well at the end of the first grade.

Differences in Word Identification and Reading Fluency across Reading Levels

A t-test was conducted in order to examine different abilities of word identification and reading fluency between the low-achievement and average-achievement groups. Table 2 presents the results of the t-test, including the descriptive data.

The t-test analyses showed that there were significant differences in word identification abilities, t=5.46, p<.01, and reading fluency abilities, t=13.57, p<.01, for different levels of reading skill. The low-achievement group performed significantly lower than the average-achievement group in early reading abilities (i.e., word identification and reading fluency). For descriptive statistics, including the mean score and percentile, the low-achievement group gained the mean score of 28.96, 64.36% in total score, and 45 for the word identification test, while the average-

Table 2

Descriptive Statistics and t-test of Word Recognition and Reading Fluency for Average- and Low-Achievement Groups

	Group				Differences in mean score	t
	Low Achievement		Average Achievement			
Measure	M	SD	M	SD		
Word Identification IdnetifiRecognition	28.96	12.42	41.59	4.08	12.63	5.46**
Reading Fluency	91.53	30.47	221.39	44.09	129.86	13.57**

Note. **p < .01

achievement group scored a mean of 41.59, or 92.42%. In addition, the mean score for the reading fluency tests were 91.53, (or24.00%) for the low-achievement group and 221.39, (97.00%), for the average group. The difference in the abilities of reading fluency between the two groups was obvious.

Correlation between PA and Early Reading

For the low-achievement group, the overall PA score highly correlated with word identification (r=.37, p<.05) and reading fluency (r=.50, p<.01). The correlation matrices for low-achievement group are summarized in Table 3. The results indicate that, for the relationship between word identification and PA subtests, word identification correlated more highly with deletion (r=.50, p<.01) and substitution (r=.37, p<.05) than with judgment and blending.

As mentioned earlier, PA and reading fluency for the low-achievement group were highly correlated (r=.50, p<.01). For the relationship between reading fluency and the PA subtests, reading fluency was highly correlated with three subtests (i.e., deletion, blending, and substitution) but not judgment. For example, the correlation coefficient of judgment and reading fluency was .16, of deletion and reading fluency was .57, of blending and reading fluency was .53, and of substitution and reading fluency was .41. The correlation coefficients demonstrated that deletion showed the highest correlation with reading fluency, while blending and substitution followed in order; thus, it appears that deletion, blending, and substitution are important factors

Table 3
Correlation among Subtests of Low-Achievement Group (n = 27)

	1	2	3	4	5	6
1. Judgment	_					
2. Deletion	.62**	_				
3. Blending	.49**	.82**	_			
4. Substitution	.42*	.69**	.73**	_		
5. Total	.73**	.92**	.91**	.84**	_	
6. Word identification	.10	.50**	.31	.37*	.37*	_
7. Reading Fluency	.16	.57**	.53**	.41*	.50**	.55**

Note. *p < .05, **p < .01

Table 4
Correlation among Subtests for Average-Achievement Group (n = 34)

	1	2	3	4	5	6
1. Judgment	_					
2. Deletion	.47**	_				
3. Blending	.54**	.51**	_			
4. Substitution	.65**	.55**	.65**	_		
5. Total	.85**	.72**	.81**	.89**	_	
6. Word identification	.21	.35*	.59**	.30	.41*	_
7. Reading Fluency	.42*	.07	.32*	.28	.36*	.36*

Note. *p < .05, **p < .01

in the performance of reading fluency. Although the PA of the low-achievement group showed highly-significant correlations with both early reading variables (i.e., word identification and reading fluency), the higher correlation of the PA and reading fluency were noteworthy. Furthermore, both word identification and reading fluency correlated more highly with deletion than with the other PA subtests.

The average group showed different results from the low-achievement group. Table 4 presents the correlation coefficients of PA and word identification, as well as PA and reading fluency for the average-achievement group. The correlation coefficient of PA and word identification was .41, (p < .01), showing highly significant correlation. The PA subtest that showed the highest correlation with word identification was blending, with deletion and substitution following in order. These results indicate that when the ability of blending changed, the ability of word identification also changed, and that the degrees of changes in both variables had a close and linear correlation.

The correlation coefficient of PA and reading fluency was .36 (p < .05), which demonstrates that PA had a highly-significant correlation with reading fluency. The judgment among PA subtests showed the highest correlation with reading fluency. The PA of the average-achievement group showed significant correlations with both word identification and reading fluency, and the correlation with word identification was higher than with the reading fluency. The most interesting result was that word identification showed a high correlation with blending while reading fluency showed a high correlation with judgment.

The correlation of PA, word identification, and reading fluency was examined for each group. The results showed that, for the low-achievement group, the correlation between PA and reading fluency was relatively high (p<.01), but the correlation between PA and word identification was not significant. On the other hand, for the average-achievement group, both the correlation between PA and word identification and the correlation between PA and reading fluency were significantly high (p<.05). The results of each subtest of PA and early reading test (i.e., word identification and reading fluency) for the low-achievement group demonstrated word identification and deletion (r=.50, p<.01), reading fluency and deletion (r=.57, p<.01), and reading fluency and blending (r=.53, p<.01) were highly correlated. For the average-achievement group, on the other hand, word identification and blending (r=.59, p<.01), and reading fluency and judgment (r=.42, p<.05) showed a high degree of correlation.

Discussion

This study investigated student abilities of PA, word identification, and reading fluency skills, and the relationship between these skills for both low- and average-achievement groups. The results of the PA ability test demonstrated that the pattern of development of PA in students using Korean differs from those using English. While students using English were more successful on a judgment test (Mann & Foy, 2003; Torgesen et al., 1997), Korean students with reading difficulties showed the highest score on a deletion test. Specifically, the low-achievement and average-achievement groups showed considerable differences in overall subtest scores. Both groups got a higher score on the deletion and blending tests, but they achieved lower scores on the judgment and substitution subtests. Furthermore, the t-test results for PA and early reading showed that low-achievement children, compared to average-achievement children, were delayed in all subtests of PA, as well as in word identification and reading fluency. Although the participants of the study were first graders, the considerable difference between the two groups demonstrated the importance of early identification and intervention in reading problems. Thus, it is necessary to identify reading problems at least in the first grade in order to prevent reading problems and establish effective reading instruction to meet students' needs.

One finding of particular interest was the highly positive correlation between PA and reading fluency in test outcomes of the low-achievement group. The most highly-correlated variable with word identification and reading fluency was deletion. Obviously, PA ability was one of the most important elements in the process of reading instruction in order for low-achievement children to read fluently and accurately. This result also implies that in order to improve the reading skills of low-achievement children earlier, educators should identify students' reading problems early and then provide differentiated services to meet these reading difficulties.

This study provides practical knowledge of reading

instruction for low achievers in a classroom setting. That is, useful information for the appropriate timing and construction of early reading instruction is necessary when educators are establishing instruction for early reading for first graders with reading difficulties. While previous studies only focused on the correlations of PA and word identification, this study suggests examining specific sub-sections of PA and including skilled reading variables, such as reading fluency, for early identification and appropriate intervention.

One possible limitation of this study was that the subjects included only first-grade children. Although previous research emphasized the importance of PA in first graders, studies of children in kindergarten, second grade, or third grade would provide more information,. Another limitation is that the sample size is not large enough to generalize the findings. Although this study concentrated on collecting specific data in detail for each student group to investigate various reading variables, the small sample size may necessitate a critical approach by researchers and educators to these findings. There is no optimal type of instruction that meets the needs of every student, but we can suggest alternative types of instruction by modifying reading constructs such as PA, word identification, and reading fluency. Future research should address the development and adjustments of intervention for early reading and resources based on a student's changing performance. Thus, constructing effective strategies tailored to individual students' reading levels and their response to instruction is in order.

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