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PRE-READING SKILLS IN TRINIDAD AND TOBAGO STUDENTS IN THE FIRST THREE YEARS OF SCHOOL

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Phonemic awareness is an important precursor of reading and has been found to predict reading comprehension scores in the middle and upper elementary school grades above and beyond contributions by tests of ability. In this study, we examined scores on the Mountain Shadows Phonemic Awareness Scale (MS-PAS) in a sample of over 4,000 students attending schools in the eight educational regions of Trinidad and Tobago. Results indicated that MS-PAS scores were reliable in this sample. A weak relationship was found between MS-PAS scores and age, and a moderate relationship was found between MS-PAS scores and grade level. There were regional and grade level differences in scores, with higher grades obtaining higher score. However, no gender differences were found at any grade level. It is suggested that phonemic awareness scores could serve as an early indicator of students in need of additional assistance in the classroom.

Reading is probably the most important academic skill that children learn. After learning to read in the first few years of schooling, students depend on reading to enable them to learn across all subject areas in subsequent years (Carnine, Silbert, & Kameenui, 1997; Stanovich, 1986). Indeed, children with a specific learning disability in reading comprise the largest percentage of the special education population in the United States (Frost & Emery, 1998). However, the identification of a specific learning disability in reading often occurs in the third or fourth year of school (Johnson, 1998; Nass, 1998), and by this time students may have developed extremely negative attitudes toward reading and school. Thus, the early identification of reading difficulties could lead to early intervention and prevention strategies that can reduce the number of students with reading difficulties in the middle and upper elementary grades.

Researchers have examined a number of variables that have been hypothesized to be related to reading achievement. The variables that have been studied intensely include cognitive ability, gender, age, socio-economic status, family environment, classroom teaching practices, and pre-reading skills. Historically, cognitive ability or intelligence has been one of the best predictors of academic tasks (Brody, 1997; Ceci & Williams, 1997; Jensen, 1998), outside of previous achievement on the same academic tasks, and this relationship also holds for reading tasks. Scarborough (1998), in an analysis of 11 longitudinal studies, reported a mean correlation coefficient of .41 between intelligence based on Wechsler intelligence test scores and future reading achievement. Similar findings have been reported using the Stanford-Binet intelligence test (e.g., Thorndike, Hagen, & Sattler, 1986).

Gender and age have also been studied with regard to language use and reading achievement. Females have been found to outperform males on tasks requiring fluent speech (Uba & Huang, 1999), although the differences are very small. Additionally, studies on the development of reading disabilities indicate that gender does not accurately predict the development of later reading difficulties (Badian, 1994; Mann & Ditunno, 1990; Scanlon & Vellutino, 1996). These researchers also found age to be a poor predictor of reading problems.

Socio-economic status (SES) is often identified as a predictor of students at risk for academic failure and dropping out of school (Barrington & Hendricks, 1989), and some researchers suggest that SES is related to learning to read. Badian (1994) and Melekian (1990) both reported a positive relationship between SES and reading success. Other researchers (e.g., Gunn, Simmons, & Kameenui, 1998; White, 1982) have argued that SES is not related to reading achievement. In fact, Gunn et al. contended that "socioeconomic status does not contribute most directly to reading achievement" (p. 25). However, another contention is that the impact of SES on reading is indirect, and is manifested through the home environment. The argument in this case is that low SES homes are less likely to have lots of books or activities that promote literacy (e.g., parents reading to young children), but the studies in this area have also been inconclusive (e.g., Scarborough, Dobrich, & Hager, 1991).

Inadequate instruction has also been suggested as one reason for lack of progress in learning to read. Many children who are delayed in reading suffer from phonological deficits, with phonemic awareness deficits being the most prevalent (Frost & Emery, 1998). Frost and Emery noted that "without direct instruction in phonemic awareness and sound-symbol correspondences, these children generally fail to attain adequate reading levels" (p. 197). This perspective suggests that teachers who subscribe to a strictly *whole-language* method of instruction are not providing appropriate learning strategies for their students. The positive results of programmes using direct instruction suggest that teacher training can play an important role in reading interventions (Bradey & Shankweiler, 1991).

In summary, a number of variables have been examined to determine if they have an impact on reading achievement. The research literature indicates that age, gender, and SES have either little or no impact on reading, or that the findings are mixed. Teacher training has been found to have an impact on reading if teachers are trained in providing direct instruction in phonics-based approaches. Thus, the current research consensus is that phonemic awareness is the most consistent and meaningful predictor of reading ability.

What is Phonemic Awareness?

Phonemic awareness refers to the ability to recognize and manipulate the phonemes in a language (Yopp, 1992), and is considered one of the most important pre-reading skills. Phonemes are the smallest units of sound in any language (Torgesen & Mathes, 2000; Uba & Huang, 1999). Phonemes (e.g., "u" and "n") combine to form morphemes (e.g., "un"), the smallest meaningful units of sound in a language. Morphemes can be part of words or whole words themselves. For example, the word "untie" is made up of the morpheme, "un," and the morpheme/word, "tie" (Uba & Huang). Later reading achievement is dependent on the mastery of these early or pre-reading skills, and there is a growing recognition that phonological-based approaches to reading are often successful in helping students to overcome their reading difficulties (Frost & Emery, 1998). Television advertisements for programmes such

as *Hooked on Phonics,* with guarantees of increases in reading achievement scores, demonstrate the growing public belief that knowledge of phonics helps with later reading.

Phonemic Awareness and Reading

Although phonemic awareness (PA) is only a pre-reading skill, the predictive validity of PA on subsequent reading achievement has received ample support in research studies (e.g., Bradley & Bryant, 1983; Mann 1984, 1993; Yopp, 1988). Some researchers (e.g., Scarborough, 1998; Tornéus, 1984) have demonstrated that learning to read increases children's awareness of phonemes and, subsequently, increases their reading achievement. In 1998, Scarborough summarized 27 PA studies. She reported a mean correlation of .46 between PA and future reading, and found that PA was one of the strongest predictors of future reading achievement, second only to measures of reading readiness and letter identification. Moreover, Adams (1990) noted that PA may develop before reading readiness and letter identification, making it one of the earliest predictors of reading, an important finding from the perspective of prevention and early intervention. Additionally, some research studies suggest that PA predicts reading achievement above and beyond the contribution of intelligence (e.g., Stanovich, Cunningham, & Feeman, 1984).

Measuring Phonemic Awareness

Perhaps the most common categorization of PA is the one put forward by Adams (1990). Adams identified five PA tasks. In order of difficulty, these tasks included (a) recognition of rhymes, (b) oddity tasks, (c) blending tasks, (d) segmentation tasks, and (e) manipulation tasks. Recognition of rhymes is considered to be the easiest of the PA tasks, and involves determining if two words rhyme, being able to recite a familiar nursery rhyme, or producing a word that rhymes with a target word provided orally. The first task involves recognizing rhyme whereas the latter two tasks involve production of rhymes.

Oddity tasks involve identifying which words have the same phonemes or different phonemes in specific positions in the word. For example, a

child may be told four words (e.g., dog, mat, door, cat) and asked to identify which word starts with the same sound as the first word. Alternatively, the child may be told a set of words and asked to identify the word that begins with a different sound from all of the others (e.g., sit, book, sand, seal). Although many oddity tasks use the first sound as the cue, it is possible to focus on the middle or ending phonemes. Adams (1990) considered oddity tasks to be the second easiest task, just above rhyming in difficulty.

Blending tasks, the third most difficult PA tasks, require putting phonemes together to create words. The stimulus in the blending task consists of a set of individual phonemes (e.g., /d/.../o/.../g/) that the child is required to blend together to produce "dog." The second most difficult task, segmenting, is the opposite of blending, and involves decomposing words into their individual phonemes. For example, a segmentation task will involve segmenting "dog" into /d/.../o/.../g/. Finally, manipulation tasks require children to manipulate the phoneme in a particular word. Manipulation can involve addition of a phoneme (e.g., adding "s" to "dog"), deletion of a phoneme (e.g., removing the first sound in "brim"), isolation of a phoneme (e.g., identifying the last sound in "hot"), or relocation of a phoneme (e.g., moving the "s" in "stop" from the beginning to the end of the word).

The Present Study

Although PA has been studied in many of the more developed countries of the world, there are few empirical studies of PA in the less developed countries. The current study, therefore, examined PA in students in Trinidad and Tobago (TT), using the Mountain Shadows Phonemic Awareness Scale (MS-PAS; Watkins & Edwards, 1998). Participants were drawn from the first three years of school, as TT students begin learning to read in the first year of school and the system recommends a phonics-based approach to teaching reading. Thus, it was hypothesized that students in the third year of schooling would have well-developed PA skills. The study also addressed a number of additional research questions. Given that the MS-PAS was developed in the United States, the second question focused on the internal consistency of MS-PAS

scores in this sample. It was hypothesized that the scores would yield reliability estimates in the moderate to high range.

Question three examined the relationship of MS-PAS scores with age, grade levels, and SES. MS-PAS scores were expected to have a high correlation with grade level, given the reciprocal relationship between PA and schooling (Perfetti, Beck, Bell, & Hughes, 1987). The relationship with age was expected to be lower than the relationship with grade level, as retention is still practised in Trinidad and Tobago, particularly with children who display low academic skills. Since the findings on the relationship between reading achievement and SES have been mixed (e.g., Badian, 1994; Gunn et al., 1998; Melekian, 1990; White 1982), no prediction was made about the relationship between SES and MS-PAS scores. Questions four through six focused on MS-PAS score differences across gender, grade, and educational region. Grade differences were expected, due to schooling effects, and differences in region were expected due to differences in SES. No predictions were made for gender. Although there are consistent gender differences favouring females in areas of reading, these differences tend to occur at higher grade levels.

Method

Participants

Participants consisted of 4,112 students (49% female) in Infant 1, Infant 2, and Standard 1, sampled from 79 schools across the eight educational regions in Trinidad and Tobago (see Table 1). Participants were randomly sampled by classroom, with stratification by population density, and they ranged in age from 4 to 14 ($M = 6.2$, $SD = 1.19$). Infant 1, Infant 2, and Infant 3 students made up 30%, 33%, and 37% of the sample, respectively. Gender participation did not differ significantly by region, X^2 (7) = 6.78, $p > .05$, or by grade, X^2 (2) = 2.17, $p > .05$.

Table 1. Participants by Educational Region

Educational Region	*N*	%
St. George West	907	22.1%
St. George East	669	16.3%
St. Andrew/St. David	226	5.5%
Caroni	623	15.2%
Nariva/Mayaro	223	5.4%
Tobago	203	4.9%
Victoria	792	19.3%
St. Patrick	469	11.4%

Measure

The instrument used in this study was the Mountain Shadows Phonemic Awareness Scale (MS-PAS; Watkins & Edwards, 1998), a 20-item oddity task. Each of the 20 MS-PAS items has four pictures that are used as visual cues. The questions involve being able to recognize whether words start with the same or different sounds. The administrator says each of the words aloud to avoid confounding reading ability with PA. The first 10 items involve presenting a target word (e.g., bus) and asking the participant to choose which of three following words (e.g., gum, corn, bus) begins with the same initial phoneme as the target word. In this case, the correct answer is "bus." The second set of 10 items involves saying all four words to the participant (e.g., head, hand, tree, hut) and asking the participant to choose the word that begins with a different initial phoneme from the others—in this case, "tree." All words are represented by pictures to decrease the memory load. Each section has two practice items at the beginning so that participants get an opportunity for corrective feedback before any items are scored.

The average administration time for the MS-PAS is 15 minutes, and the instrument can be administered individually or in small groups. Three scores are calculated for the MS-PAS: a Same Sound subscale score (SS), a Different Sound subscale score (DS), and a Total Scale score (TS). The

SS and DS scores can range from 0-10, and the TS score can range from 0-20.

The psychometric information available on the test is impressive, given the test's recent availability. Watkins and Edwards (1998) reported internal consistency estimates for TS scores in kindergartners and Grade 1 students (N = 137) of .90 and.87, respectively, paralleling the high reliability estimates associated with intelligence test scores. Wyglinski (2000) also reported reliability estimates for MS-PAS scores that were in the good to excellent range (Cicchetti, 1994); she obtained internal consistency estimates of .85 and .89, and 2-week test-retest estimates of .75 and .88, respectively for kindergartners and first-graders in central Pennsylvania. Watkins and Edwards (2001) also reported 5-month stability estimates of .73 for 117 students.

There is also a fair amount of validity evidence for MS-PAS scores. Concurrent validity coefficients of MS-PAS scores with the Test of Phonological Awareness (TOPA: Torgensen & Bryant, 1994) were .89 and .91, respectively, after corrections for restriction of range (Wyglinski, 2000). MS-PAS scores collected at the beginning of first grade also demonstrated moderate correlations with teacher ratings of reading curriculum mastery taken at the end of first grade (r = .43), with teachers unaware of the students' MS-PAS scores or their achievement scores (Watkins & Edwards, 2001). Watkins and Edwards also reported a 1-year predictive validity coefficient of .62 with total reading score on the Gates-MacGinitie Reading Tests (MacGinitie & MacGinitie, 1989), indicating that MS-PAS scores accounted for almost 40% of the variance in reading achievement a full year later. Finally, MS-PAS scores from the beginning of first grade had a correlation of .43 with both Stanford Achievement Test total reading scores and teacher ratings obtained at the end of Grade Three (Watkins & Edwards).

The choice of the MS-PAS with its exclusive focus on oddity tasks was determined by a variety of factors: 1) the instrument can be administered in groups, which makes collecting data from a large sample easier than individually administered measures; 2) despite its use of only oddity tasks, MS-PAS scores have demonstrated strong reliability and validity coefficients; and 3) oddity tasks are only second in difficulty in the

phonemic awareness hierarchy. Thus, the instrument seemed well suited for preliminary examination of phonemic awareness in a new population.

In addition to MS-PAS scores, demographic data on age, gender, and educational region were collected. The 1996 mean monthly income of families by region of the country was obtained from the Central Statistical Office (Trinidad and Tobago [T&T]. CSO, 1997). These figures were the most recent available at the time.

Procedure

Data were collected by Guidance and Special Education Officers attached to the Central Guidance Unit and the Special Education Unit of the Ministry of Education. All officers were trained in the administration of the form by three professors from the Department of Educational and School Psychology and Special Education at the Pennsylvania State University. Training included a review of the importance of standardization of assessment procedures as well as supervised practice in the administration of the form. Data were collected over a 2-month period in the first term of the school year.

Results

Preliminary Analyses

Means and standard deviations by grade and gender are presented in Table 2 for the SS and DS subscales, and the Total Score. A number of patterns are evident in the table: 1) as grade level increases, so do the PA scores; 2) females obtain consistently higher scores than males on all subscales, although the differences are very small; 3) the scores on the DS subscale are lower than the scores on the SS subscale at all grade levels; and 4) although Standard 1 students have the highest mean scores, there is a substantial portion of students in this grade who are still making errors on this PA task. Figure 1 shows the percentage of students at each grade level with a perfect score on each subscale. As can be seen, even in Standard 1, only 56% of students got all the SS items correct.

Internal Consistency Estimate

Internal consistency estimates were calculated using Cronbach's alpha (Cronbach, 1951). The estimates for the entire sample's scores were in the moderate to high range SS (.84), DS (.83), and TS (.89). The internal consistency estimates for gender and grade groups ranged from .67 to .89 (see Table 3), with only two estimates for the Infant 1 SS scores falling below .70. In all other cases, the internal consistency estimates were at least .75 or higher.

Correlations with Age, Grade, and Income

The three MS-PAS scores were correlated with both age and grade using Pearson product-moment correlation coefficients. These results are presented in Table 4. Correlations with age were in the low range (*Mdn* = .34) and correlations with grade were in the moderate range (*Mdn* = .46). A correlation of mean monthly income for each educational region and MS-PAS scores resulted in correlations of .74, indicating that 55% of the variance in PA scores is explained by the socio-economic status of the areas where the students live.

Table 2. Means and Standard Deviations of MS-PAS Subscales by Grade and Gender

	Female		Male	
	M	*SD*	*M*	*SD*
Same Sound				
Infant 1	6.16	2.75	5.81	2.94
Infant 2	8.50	2.08	8.44	2.11
Standard 1	8.99	1.65	8.90	1.75
Different Sound				
Infant 1	3.95	2.37	3.79	2.35
Infant 2	6.23	2.80	6.13	2.85
Standard 1	7.40	2.66	6.94	2.78
Total Score				
Infant 1	10.12	2.75	5.81	2.94
Infant 2	14.73	4.37	14.57	4.38
Standard 1	16.39	3.83	15.83	3.98

Note. MS-PAS = Mountain Shadows Phonemic Awareness Scale.

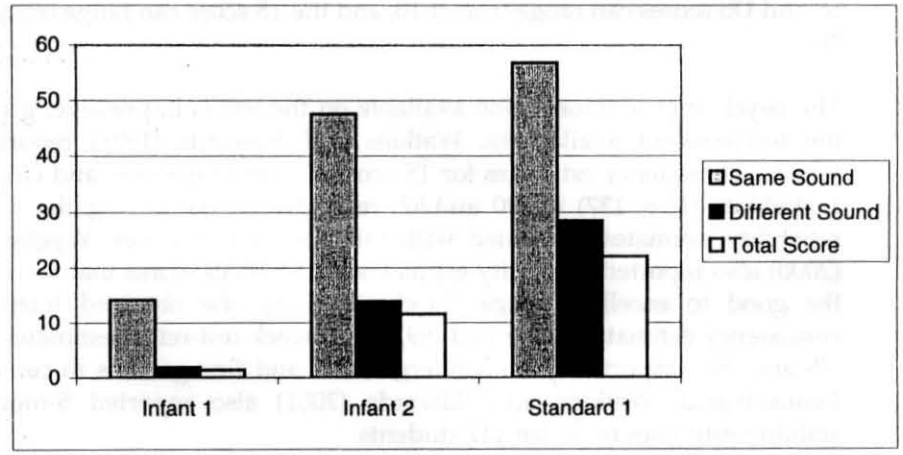

Figure 1. Percentages of students obtaining perfect scores on the three MS-PAS scales.

Table 3. Internal Consistency Estimates of MS-PAS Subscale Scores by Grade and Gender

	Female	Male
Same Sound (10 items)		
Infant 1	.67	.66
Infant 2	.81	.82
Standard 1	.83	.83
Entire sample	.83	.84
Different Sound (10 items)		
Infant 1	.78	.81
Infant 2	.79	.79
Standard 1	.75	.76
Entire sample	.83	.83
Total Score (20 items)		
Infant 1	.82	.83
Infant 2	.87	.86
Standard 1	.86	.86
Entire sample	.89	.89

Note. MS-PAS = Mountain Shadows Phonemic Awareness Scale

Table 4. Correlations of MS-PAS Subscale Scores with Age and Grade Level

	Age	Grade
Same Sound	.34	.46
Different Sound	.33	.45
Total Score	.37	.50

Note. MS-PAS = Mountain Shadows Phonemic Awareness Scale

Group Differences

Given the unequal numbers of students from the eight educational regions, group differences across regions were examined with both ANOVA and the Kruskal Wallace test. Group differences in grade level and gender were examined using a 3 x 2 factorial ANOVA. The critical alpha level for all analyses was set at .001 to control for Type I error. The results of these analyses are summarized in Table 5.

Educational region differences

Students' MS-PAS scores differed significantly across educational region (see Table 5). The Levene Homogeneity of Variance test was significant, and the regional differences were re-analyzed using the non-parametric Kruskal Wallace test, which also yielded significant results ($p < .001$). As Figure 2 indicates, mean scores between the highest and lowest regions differed by about two points on the two subscales and about four points on the total score, and urban areas obtained higher scores than rural areas. However, although the differences were significant, as can be seen in Table 5, the effect sizes were all less than .1.

Grade level and gender differences

As indicated by the moderate correlations between grade level and MS-PAS scores, Infant 2 scores were significantly higher than Infant 1 scores, and Standard 1 scores higher than Infant 2 scores. These differences had

the highest effect sizes (*Mdn* r = .25). A significant homogeneity of variance test led to a reanalysis using Mann Whitney U, which also yielded significant results. None of the three MS-PAS subscales differed significantly on gender at the critical alpha level, and the effect sizes were, in essence, zero.

Table 5. Summary of Results on Group Differences in MS-PAS Scores

	F	Sig.	Eta Squared	Non-Parametric Tests	Sig.
Grade					
SS	664.6	.001	.25	947.08	.001
DS	541.8	.001	.21	870.66	.001
TS	773.2	.001	.27	1088.50	.001
Gender					
SS	5.8	.016	.00	-2.01	.045
DS	8.5	.004	.00	-3.26	.001
TS	9.4	.002	.00	-3.25	.001
Region					
SS	37.6	.001	.06	259.02	.001
DS	35.6	.001	.06	238.59	.001
TS	44.7	.001	.07	286.71	.001

Note. MS-PAS = Mountain Shadows Phonemic Awareness Scale. The Kruskal-Wallace test was used as the non- parametric test for Grade and Region, and Mann-Whitney U was used as the non-parametric test for gender.

Discussion

MS-PAS scores of TT students in the first three years of school were examined in this study. The results indicated that MS-PAS scores had moderate to high reliability in this sample, and they had low, moderate, and high correlations with age, grade level, and SES, respectively. Further analyses indicated regional and grade level differences in MS-PAS scores, as predicted. However, no meaningful gender differences were found.

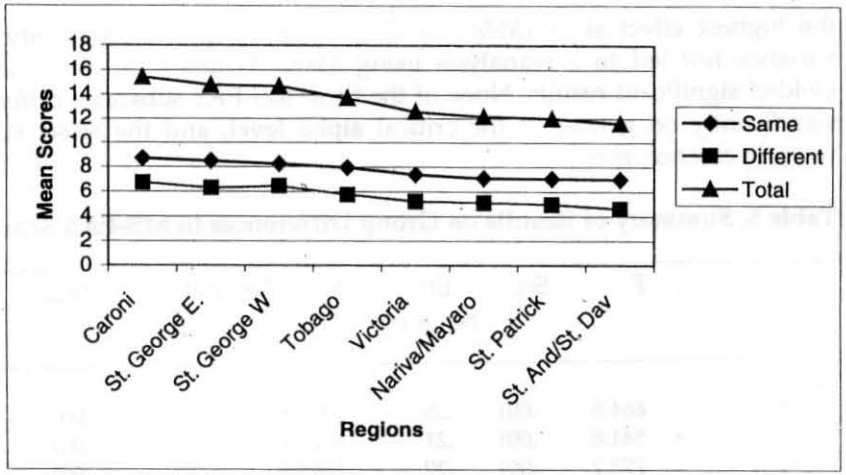

Figure 2. Mean MS-PAS scores by educational region.

Internal Consistency

As Goodwin and Goodwin (1999, p. 409) noted, reliability and validity are "properties of the scores obtained from the use of a measure—under certain conditions and with a particular group of participants, rather than the properties of instruments per se." Thus, we could not assume that MS-PAS scores would be reliable in a TT sample, especially given the different cultural context. Moreover, it was also important to examine the internal consistency reliability coefficients in the subgroups of the sample (e.g., Infant 1, females). The results indicated that the scores were generally reliable with most estimates being above .75. Moreover, the two estimates in the .6 range are not as problematic as they appear. Goodwin and Goodwin also indicated that reliability estimates of less than .70 might be expected "with special groups of respondents, such as young children" (p. 415). Thus, the current findings indicate that MS-PAS scores are internally consistent for TT students, a first step towards establishing the validity of the scores in this population.

MS-PAS Scores in Different Groups

As hypothesized, MS-PAS scores were more strongly correlated with grade level than age, although even the grade level correlations were in the moderate range. In addition, an examination of mean differences revealed significant differences in grade level. Moreover, only the grade level differences produced meaningful effect sizes. These findings support the contention that simple maturation does not have a substantial impact on reading skills (Badian, 1994; Mann & Ditunno, 1990; Scanlon & Velluntino, 1996); rather, formal educational experiences are needed, and one expects that more effective teaching would have a greater impact than less effective teaching (Frost & Emery, 1998).

As indicated previously, research addressing the relationship between SES and reading achievement has produced mixed results (Badian, 1994; Gunn et al., 1998; Melekian, 1990; White, 1982). In this study, MS-PAS scores were strongly correlated with the SES of the educational region, and rural regions with lower mean incomes had significantly lower MS-PAS scores than urban areas with higher incomes. While the correlation suggests that the impact of SES on PA is substantial ($r^2 = 55$), the effect sizes of the regional differences based on ANOVA were small.

More important than the group differences, however, were the percentages of students who had mastered oddity tasks as measured by the MS-PAS at the three grade levels. Even on the SS subscale, which is the easiest of the oddity tasks, less than 60% of the students in Standard 1 got all of the items correct. These figures are lower for the DS and TS scores, with less than 25% of the students in Standard 1 obtaining a perfect TS score. Moreover, when we consider (a) that the students in Standard 1 have already had two years of reading instruction and (b) that oddity tasks are the second easiest PA task, these findings paint a disappointing picture of student progress in this area of pre-reading skills. These figures may explain why teachers in junior secondary schools are reporting substantial numbers of students entering the junior secondary grades unable to read the textbooks that are required at that level, and why increasing numbers of students are not passing the CXC Basic and General English Language examinations (T&T. CSO, 1998).

Implications of the Results

These data also raise a number of critical questions about education and reading instruction in the early grades in Trinidad and Tobago. Why are students not doing better, even after two years of instruction? What is the quality of the instruction in these early grades? How well is the phonics-based approach that teachers purport to teach known by teachers, and how well do they teach this approach? What types of assessment do teachers conduct of their practice and of their students' competencies? What is the quality of the reading instruction received in the teachers' training colleges? Finally, are there differences in the effectiveness of the trained and untrained teachers in the system?

The results of this study provide at least two positive outcomes. First, they indicate that there is a problem in the development of pre-reading skills, a problem that we need to address. However, the higher correlation of MS-PAS scores with grades than with age also suggests that schooling is making a difference. The second positive outcome of the study is that the MS-PAS provides a way to identify students in need of prevention strategies in the Infant years and those in need of prevention in Standard 1 and higher grades. Further, MS-PAS scores can be used to track individual or group progress over time. Moreover, to the extent that pre-reading skills continue to develop, it will be important to examine MS-PAS scores at the end of the Standard 1 year to see if there are substantial increases in the numbers of students obtaining perfect scores.

Conclusion

Phonemic awareness, or the ability to recognize and manipulate the phonemes in a language, is an important pre-reading skill that is predictive of subsequent reading achievement. Scores on the MS-PAS, a phonemic awareness scale consisting of oddity items, were found to be internally consistent for Infant 1, Infant 2, and Standard 1 students in Trinidad and Tobago. Moreover, students with more schooling had higher scores. Scores also differed by educational region, with students in more affluent urban areas obtaining higher scores than students from rural and less affluent areas. No significant gender differences were found. The results indicated that too few students in Standard 1 are achieving a perfect score on the test. It may be useful to use the MS-PAS as an early diagnostic tool upon school entry to identify students who would benefit from additional instruction in this important academic area.

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