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ABSTRACT

A study focused on a comparison of phonemic awareness skills between kindergarten students from English-speaking and non-English-speaking homes. The subjects, 267 kindergarten students in a major urban school system south of Boston, Massachusetts, participated in a phonemic awareness development program over a four-month period. The participants were classified into two categories according to the primary language spoken in the home: English (EHL) and non-English (NEHL). Posttest results indicated phonemic skill gains for both groups. Although the NEHL group had lower scores than the EHL group on both the prettest and the posttest, effect size measures (standardized differences and eta-squared) supported a larger program effect for the NEHL group. Implications for urban educators are discussed. (Contains 17 references and 5 tables of data.) (Author/RS)

# Phonemic Awareness Skills in Kindergarten Students from English and Non-English Speaking Homes

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## Abstract

Two hundred and sixty-seven kindergarten students participated in a phonemic awareness development program over a four month period. The participants were classified into two categories according to the primary language spoken in the home: English (EHL) and non-English (NEHL). Posttest results indicated phonemic skill gains for both groups. Although the NEHL group had lower scores than the EHL group on both the pretest and posttest, effect size measures (standardized differences and eta-squared) supported a larger program effect for the NEHL group. Implications for urban educators are discussed.

## Introduction

Research over the past 20 years has supported the concept of phonemic awareness as an important component of childrens' success in learning to read. Basically, phonemic awareness is the understanding that words are made up of individual sounds and the ability to consciously identify and manipulate these component sounds (Adams, Foorman, Lundberg, & Beeler, 1998). Activities designed to promote phonemic awareness are primarily oral, and can be divided into five levels (Adams, 1990). While not necessarily sequential, the first four of these are typically developed by the end of kindergarten.

The five levels of phonemic awareness activities discussed by Adams (1990) are as follows. First is the ability to hear rhymes and alliteration. This skill is typically developed by nursery rhymes and songs. Second is the ability to do oddity tasks. For example, which word begins with a different sound (*sat, hid, send*)? Third is the ability to orally blend sounds to form words (i.e., blending the sound */s/, /a/ and /t/* to form the word *sat*). The fourth level involves the ability to segment words (namely, to break down *sat* into its component sounds */s/, /a/, /t/*). And the fifth level is the ability to perform phonemic manipulation tasks, such as isolation, deletion, and substitution. An isolation task might involve having the child tell what sound a word begins or ends with. A deletion task might require the child to say *ball* without the */b/*. Substitution would usually involve a demand such as replacing the */s/* sound in *sat* with a */k/*. Activities designed to promote, or to assess, the above five levels may involve discrimination between sounds, as in: "Do these words rhyme? *fun – sun.*" Or, at a higher level of

difficulty, task demands may involve production, as in: "Tell me a word that rhymes with *fun*?" Moreover, the tasks may require the manipulation of phonemes, syllables, or sentences. Occasionally, manipulatives, such as blocks, are utilized to facilitate understanding. For example, different colored blocks may be used to represent different sounds; and children can thus learn to manipulate sounds by their association with blocks.

The importance of phonemic awareness skills as a predictor of reading success has been well documented. Various research has indicated that pre-school levels of phonemic awareness can account for up to 50% of the variance in reading skills at the first grade level (Blachman, 1991; Juel, 1991; Stanovich, 1986; Wagner, Torgesen, & Rashotte, 1994). Moreover, cross-cultural studies have supported the predictive power of phonemic awareness in other languages, including Swedish, Norwegian, Spanish, French, Italian, Portugese, and Russian (Lundberg, Olofsson, & Wall, 1980; Hoien, Lundberg, Stanovich, & Bjaalid, 1995; deManrique & Gramigna, 1984; Alegria, Pignot, & Morais, 1982; Cossu, Shankweiler, Liberman, Tola, & Katz, 1988; Cardoso-Martins, 1995; Elkonin, 1973).

A major issue for educators involves the diversity in levels of phonemic skills that children possess when they enter school. Some evidence indicates that poor children do not have difficulty with auditory discrimination, but do have difficulty with phoneme recognition when learning to read (Wallach, Wallach, Dozier, & Kaplan, 1977). Adams (1990) reports that without direct instructional support, phonemic awareness eludes roughly 25% of middle-class first graders, and substantially more of those who come from less literacy-rich backgrounds. Subsequently, such children evidence serious

difficulty in learning to read and write. It seems likely that such a problem would be exacerbated in urban school systems, where a large percentage of the population comes from either an economically disadvantaged or from a linguistic background other than English. Wallach et al. (1977) demonstrated that poorly developed phonemic awareness distinguished disadvantaged pre-schoolers from their more advantaged peers. This study focused on a comparison of phonemic awareness skills between kindergarten students from English speaking and non-English speaking homes.

## Methodology

### *Sample*

During January, 1999 a phonemic awareness development program was instituted in selected sites in a major urban school system south of Boston. Teachers volunteered to participate on the basis of interest in the topic and/or the receipt of professional development credits. Nine kindergarten teachers from four school sites participated. There were 267 half-day kindergarten students in the study. Their age ranged from five years, two months to six years, seven months, with a mean age of five years, seven months. The sample consisted of 128 male (48%) and 139 female (52%) students. The racial composition of the sample was 64 black/non-hispanic (24%); 32 hispanic (12%); 152 caucasian (57%); and 19 other (7%). Two hundred and forty-three (91%) were regular education students, with twenty-four (9%) of the sample receiving special services. The bulk of the special education students (more than 60%) received services in the area of speech and language.

For the purpose of this study, teachers were asked to classify students into one of two categories based on the primary language spoken in the home: English home language (EHL) or non-English (NEHL) home language. While only three students (1.1%) officially received any service from the bilingual department, 40 students (15%) were classified by their teachers as coming from home environments where English was not the primary language. Thus, while these children either did not meet the eligibility requirements for bilingual education, or their parents opted for the mainstream educational setting, their linguistic background and home environment were primarily non-English; and they all were placed in a mainstream kindergarten class.

*Instrumentation*

Teachers were asked to implement phonemic awareness activities for 15 to 20 minutes daily, using a program of activities suggested by Adams et al. (1998). The various activities involved games comprising the levels of phonemic awareness presented above, including listening, rhyming, segmentation, and blending activities. Adams (1998) also provides an assessment of phonemic awareness which contains six subtests: Detecting Rhymes; Counting Syllables; Matching Initial Sounds; Counting Phonemes; Comparing Word Lenghts; and Representing Phonemes with Letters. Each subtest contains five items are scored 1 or 0, yielding a possible score of 5 points per subtest or 30 points for the entire instrument.

Detecting Rhymes is assessed by having children draw a line between pictures representing words that rhyme. the Counting Syllables subtest requires children to

indicate (by tally marks) the number of syllables in the word represented by each of five pictures. Matching Initial Sounds asks children to draw a line connecting pictures that begin with the same sound. Counting Phonemes requires the examinee to indicate (by tally marks) the number of phonemes in the words represented by each of 5 pictures depicted on a page. Comparing Word Lengths presents the examinee with 5 pairs of pictures. The task is to circle the picture that represents the word with the greatest number of phonemes. Finally, Representing Phonemes with Letters asks the child to spell the word represented by each of 5 pictures. While the test appears relatively straightforward with respect to administration and scoring, no information regarding validity or reliability is provided.

*Procedures*

Teachers participated in 12 one-hour discussion groups from January to June, 1999. The groups were moderated by the researcher and a certified reading resource specialist, who is also an adjunct professor of reading at the graduate level. Sessions were devoted to issues such as the nature of phonemic awareness, the implemenation of the phonemic awareness activities, and the administration and scoring of the assessment instrument. Pretesting was completed during the month of January; and posttest assessment was conducted from early to mid-June. All testing was done on an individual basis by the classroom teacher. Thus, the program of activities itself was of approximately four months duration.

*Analysis*

Since the purpose of the current study was to examine the effects of phonemic awareness activities on urban kindergarten students from English and non-English speaking home environments, results will be presented in terms of effect sizes. It is well known that statistical significance is largely a function of sample size; and in large enough samples, small differences will achieve "statistical significance" even when they are meaningless from a practical standpoint. Consequently, the fourth edition of the American Psychological Association style manual (APA, 1994), as well as many prominent researchers (Thompson, 1993; Cohen, 1994; Kirk, 1996) have encouraged the reporting of effect size statistics as an estimate of the magnitude or "practical" significance of the results.

Two types of effect sizes are typical: (1) those that estimate the amount of variance accounted for; and (2) those that standardize mean differences (Kirk, 1996). For the present study, eta-squared and delta will be reported. Eta-squared estimates the amount of variance accounted for by a particular effect (in this case, home language) by dividing the sum-of-squares for that effect by the total sum-of-squares. Delta estimates the magnitude of the difference between two means. Delta is obtained by computing the difference between the means of a treatment and control group, and dividing by the standard deviation of the control group. Strictly speaking, the current study does not involve a control group; therefore, the standard deviation of the English home language group was used as the denominator in all computations.

## Results

Comparison of pretest-posttest results show improvement in phonemic awareness skills both for students from English home language (EHL) and non-English home language (NEHL) environments. As Table 1 indicates, gains were made by regular education as well as special education/504 plan students in both the EHL and NEHL categories. (A 504 plan indicates students with an identified disability who do not require specialized instruction via an IEP). For example, regular education students for the combined sample gained 4.65 points. A comparison of results for regular education students from the EHL and NEHL groups shows that while students from non-English speaking homes generally began and finished with lower scores, they actually made slightly larger gains (i.e., a gain of 4.43 for regular education EHL compared with 5.82 for the NEHL regular education students). The sample size for a special education EHL-NEHL comparison is too small to provide reliable inferences.

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Insert Table 1 about here.

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The differential gain between students from the EHL and NEHL groups is further explicated by data in Table 2. Table 2 presents results broken down by gender. The most impressive gain shown in Table 2 is that of NEHL males (7.53 points), compared to a gain of 4.27 points for their EHL male counterparts. It is noteworthy that males in the NEHL category actually scored lower on the pretest, but higher on the posttest than NEHL females.

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Insert Table 2 about here.

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An examination of the subtest performance of both groups (Table 3) indicates that, although NEHL students scored at lower levels on every subtest of the pretest and posttest than EHL students, they evidenced larger gains on all subtests, except Counting Phonemes.

It is well established fact that gain scores are notoriously unreliable, and must be interpreted with caution (Linn, 1981). Statistical artifacts such as regression to the mean can cause scores to improve spuriously. Furthermore, the mere presence of gains does not ensure that the gains are objectively or educationally meaningful. Certainly, inferences made in the absence of a control group must be tentative. Nevertheless, these data appear to support the beneficial effects of phonemic awareness activities (especially males) from non-English speaking homes.

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Insert Table 3 about here.

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Table 3 also indicates that the highest skill levels were obtained in the areas of Detecting Rhymes, Counting Syllables, and Matching Initial Sounds. Once again, a note of caution must be inserted. Adams et al. (1998) offer the following guidelines regarding score interpretation. If the average score is less than 4.0 in any given subtest area, the

corresponding section of the curriculum should be revisited. If the average score is less than 3.0, the corresponding section of the curriculum warrants more serious attention. Clearly, the overall results indicate relatively weak levels of phonemic awareness in the sample. This may be due, in part, to the abbreviated duration of the program (4 months). It is hoped that a full year program would yield higher skill levels. Also, it appears, based on teacher discussion groups, that teachers devoted more time to the Detecting Rhymes, Counting Syllables, and Matching Initial Sound activities, while the other subtest areas may require somewhat more advanced or difficult skills, especially Counting Phonemes and Representing Phonemes with Letters.

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Insert Table 4 about here.

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In terms of the effect sizes associated with home language status, Table 4 presents the means, standard deviations, and sums-of squares for pretest-posttest comparisons. Table 4 indicates that eta-squared, the amount of variance accounted for by the home language effect, declines from 6% for the pretest to 2% at posttest. This decline in the percentage of test score variance associated with home language is an indication of the benefit of the program for the NEHL group. That is to say, home language status was less of an effect at the end of the program than it was at the beginning. Similarly, an examination of eta-squared by subtest (Table 5) shows that the decline in variance attributable to home language was consistent across all subtests, except Counting Phonemes.

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Insert Table 5 about here.

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Computation of standardized differences (delta) supports the contention of a differential program effect according to home language. The standardized pretest-posttest difference for the EHL group was .66, indicating a gain of about two-thirds of a standard deviation; the standardized pretest-posttest difference for the NEHL group was 1.05 (using the NEHL pretest standard deviation as a denominator) and .88 (using the EHL pretest standard deviation as a denominator). The indication is that the NEHL group gained upwards of a full standard deviation.

Examining the delta values for the standardized differences between the EHL and NEHL groups separately for the prestest and posttest, one again finds the standardized difference to be lower for the posttest than the pretest. Delta for the EHL-NEHL difference in pretest scores was .68, but for posttest scores was .44, again indicating the lessened effect for home language at the program's end.

## Discussion

The results from this study are congruent with previous research on phonemic awareness. Generally, this sample of kindergarten students from a large, middle to low economic urban area, evidenced a lack of phonemic awareness skills upon entering school, and developed them somewhat over a relatively brief period of time. However,

of especial import to urban educators is the finding that male students from non-English speaking homes appeared to have made the greatest gains. Thus, phonemic awareness skills, critical in learning to read, can be developed in those very students who do not typically bring them to school.

Further research needs to investigate whether a full year program would bring urban students' phonemic skills to the levels indicated by Adams et al. (1998). Also, some attention should be paid to measurement issues regarding the use of a paper and pencil, group assessment of what are essentially oral skills. What is the convergent validity with individual, oral measures? Perhaps some comparison of various methods of assessing phonemic awareness is warranted.

In sum, given existing empirical support, as well as organizational (International Reading Association, 1998) and legislative initiatives (Cf. California Statutes, AB1626 *Pupil Promotion and Retention*, 1998) which specifically support the benefits of phonemic awareness, urban educators are well advised to consider the potential effects of phonemic awareness training on their students. While federal legislation specifically governs the education of students who qualify for bilingual (P.L. 90-247) and special education (P.L. 94-142) services, a large segment of the urban school population is eligible for neither type, and yet is deficient in an array of skills known to be critical to reading achievement. Urban educators might do well to foster the development of phonemic awareness skills early on in the instructional sequence of reading.

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Table 1
Phonemic Awareness Mean Scores
Kindergarten Students by Language of Home and Special Education Status

| | Pretest | Posttest |
|---|---|---|
| Home Lang. | | |
| English | | |
| No IEP | 13.87 (201) | 18.30 (196) |
| IEP | 9.53 ( 17) | 13.35 ( 17) |
| 504 | 7.75 ( 4) | 10.50 ( 4) |
| Total | 13.43 (222) | 17.77 (217) |
| Non-English | | |
| No IEP | 9.13 ( 38) | 14.95 ( 37) |
| IEP | 5.00 ( 2) | 11.00 ( 2) |
| 504 | | |
| Total | 8.93 ( 40) | 14.74 ( 39) |
| Combined | | |
| No IEP | 13.12 (239) | 17.77 (233) |
| IEP | 9.05 ( 19) | 13.11 ( 19) |
| 504 | 7.75 ( 4) | 10.50 ( 4) |
| Total | 12.74 (262) | 17.31 (256) |

Note: ( ) indicates the number of students.

Table 2
Phonemic Awareness Mean Scores
Kindergarten Students by Language of Home and Gender

| | Pretest | Posttest |
|---|---|---|
| Home Lang. | | |
| English | | |
| Male | 12.54 (105) | 16.81 (103) |
| Female | 14.22 (117) | 18.64 (114) |
| Total | 13.43 (222) | 17.77 (217) |
| Non-English | | |
| Male | 8.62 ( 21) | 16.15 ( 20) |
| Female | 9.26 ( 19) | 13.26 ( 19) |
| Total | 8.93 ( 40) | 14.74 ( 39) |
| Combined | | |
| Male | 11.89 (126) | 16.70 (123) |
| Female | 13.53 (136) | 17.87 (133) |
| Total | 12.74 (262) | 17.31 (256) |

Note: ( ) indicates the number of students.

Table 3
Subtest Score Means by Group

| | Pretest | Posttest | Gain |
|---|---|---|---|
| Detecting Rhymes | | | |
| EHL | 3.15 (224) | 4.11 (219) | .96 |
| NEHL | 2.20 ( 40) | 3.44 ( 39) | 1.24 |
| Total | 3.01 (264) | 4.01 (258) | 1.00 |
| Counting Syllables | | | |
| EHL | 3.06 (225) | 3.88 (218) | .82 |
| NEHL | 1.95 ( 40) | 3.41 ( 39) | 1.46 |
| Total | 2.89 (265) | 3.81 (257) | .92 |
| Matching Initial Sound | | | |
| EHL | 2.59 (225) | 3.37 (219) | .78 |
| NEHL | 1.57 ( 40) | 2.74 ( 39) | 1.17 |
| Total | 2.44 (265) | 3.27 (258) | .83 |
| Counting Phonemes | | | |
| EHL | 1.33 (224) | 2.12 (219) | .79 |
| NEHL | 1.02 ( 40) | 1.54 ( 39) | .52 |
| Total | 1.28 (264) | 2.03 (258) | .75 |
| Comparing Word Lengths | | | |
| EHL | 2.85 (225) | 3.29 (218) | .44 |
| NEHL | 2.10 ( 40) | 2.92 ( 39) | .82 |
| Total | 2.74 (265) | 3.23 (257) | .49 |
| Representing Phonemes with Letters | | | |
| EHL | .46 (224) | 1.03 (218) | :57 |
| NEHL | .08 ( 40) | .69 ( 39) | .61 |
| Total | .40 (264) | .98 (257) | .58 |

( ) indicates number of students

Table 4
Phonemic Awareness Effect Sizes

| | Pretest | | | Posttest | | |
|---|---|---|---|---|---|---|
| | Mean | N | SD | Mean | N | SD |
| EHL | 13.43 | 222 | 6.60 | 17.77 | 217 | 6.87 |
| NEHL | 8.93 | 40 | 5.51 | 14.74 | 39 | 7.05 |
| Total | 12.74 | 262 | 6.63 | 17.31 | 256 | 6.97 |
| SOS (between): | 687 | | | 303 | | |
| SOS (total): | 11484 | | | 12377 | | |
| eta-squared: | .0598 | | | .0244 | | |

Table 5
Home Language Effect Eta-squared by Subtest

| | Pretest eta-squared | Posttest eta-squared |
|---|---|---|
| Detecting Rhymes | .028 | .020 |
| Counting Syllables | .055 | .014 |
| Matching Initial Sounds | .031 | .013 |
| Counting Phonemes | .007 | .018 |
| Comparing Word Lengths | .035 | .010 |
| Representing Phonemes with Letters | .018 | .006 |
| Total Test | .060 | .024 |

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