The Power of Phonological Awareness as a Predictor of Basic Reading Skill

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The importance of phonological awareness as a foundation for the development of basic reading skills has been demonstrated in recent studies and reports (Ehri, 1991, 1994; Morais, Bertelsen, Cary, & Alegria, 1987; Share, Jorm, MacLean, & Matthews, 1984; Snow, Burns, & Griffin, 1998; Stanovich, 1994). Further, additional studies (Bradley & Bryant, 1983; Bruck, 1992, 1993; Fawcett & Nicholson, 1995; Fletcher, Shaywitz, Shankweiler, Katz, Lieberman, Stuebing, Francis, Fowler, & Shaywitz, 1994; Fox & Routh, 1980; Lindamood, Bell, & Lindamood, 1992; Lyon, 1995) have demonstrated the importance of PA in the assessment and remedial instruction of disabled readers. And finally, PA has been a focus of substantial inquiry in government reports (National Reading Panel, 2000) and reviews (Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh, & Shanahan, T. 2001). As such, for clinics and reading centers in which reading abilities and disabilities are assessed, the understanding of the impact of PA on basic reading should be a critical element of any reading assessment protocol.

Accordingly, the purpose of this paper is to report two investigations conducted at a Midwest university reading center in which the predictive relationship of phonological awareness on basic reading was studied.

**Defining Phonological Awareness**

Phonological awareness (PA) has been defined by literacy authorities (Adams, 1990; Snow, et al., 1998; Stanovich, 1994; Torgesen, 1996) as the ability to work explicitly with sound elements smaller than the syllable. PA involves the conscious
ability to manipulate individual speech sounds within words (Lundberg, Frost, & Petersen, 1988). More recently, ability in PA has been associated with six specific linguistic tasks that have become the target of assessment and instruction (Ehri, et al., 2001; National Reading Panel, 2000). These include the following:

1. **Phonemic isolation** – ability to recognize individual sounds in words.
   
   Example: “Tell me the first sound in ginger.” (/j/)

2. **Phoneme identity** – ability to recognize the common sound in different words.
   
   Example: “Tell me the sound that is the same in peach, pile, and pickle? (/p/)

3. **Phoneme categorization** – ability to recognize the word with an odd sound among a sequence of three to four words.
   
   Example: “Which word does not belong? bug, rug, bun, bus.” (rug)

4. **Phoneme blending** - ability to listen to individual sounds and to combine them into a recognizable word.
   
   Example: “What word is /k/ /æ/ /t/?” (cat)

5. **Phoneme segmentation** – ability to break a word into it sounds by tapping or counting the sounds.
   
   Example: “How many phonemes are in rain? (3: /r/ /æ/ /n/)

6. **Phoneme deletion** – ability to recognize what word remains when a specified phoneme is removed. Phoneme deletion is also referred to as elision.
   
   Example: “What is stall without the /s/?” (tall)
Two of these tasks, phoneme blending and phoneme deletion are assessed as part of the phonological awareness cluster on the Comprehensive Test of Phonological Awareness (CTOPP) (Wagner, Torgesen, & Rashotte, 1999) and were the focus of the present studies.

The Studies

The first study, Opatrny (1999), investigated the correlation of two subtests from the CTOPP (Wagner, et al., 1999) with two subtests from the Woodcock Diagnostic Reading Battery (WDRB) (Woodcock, 1997). The subjects for the first investigation were fifty-three children enrolled in a university reading center intervention program.

In the second investigation (Opatrny, French, & Cochran, 2000), a regression analysis was conducted to ascertain the predictability of significant relationships of the six subtests from the CTOPP with the Total Reading cluster from the Woodcock Diagnostic Reading Battery. In this second investigation, thirty existing diagnostic case records from an existing data base of client records were reviewed.

These studies are justified for the following three reasons. First, just as teachers conduct action studies to evaluate their teaching methods, clinical diagnosticians must also assess their practice. One way in which this can be done is by studying the tests used in assessment. The second reason for the studies stems from the technical development of the CTOPP. The authors completed several studies in which the CTOPP was correlated to formal reading tests. One study compared the CTOPP to the Woodcock Test of Reading Mastery. However, no previous test had been conducted to correlate the CTOPP to the Woodcock-Johnson Achievement Test or to the Woodcock Diagnostic Reading Battery, which contains the reading subtests of the WJAT. Finally, the studies were justified in
that they provided the clinical staff of the participating university reading center with information needed to provide better reading interpretations and diagnoses.

**Study 1**

**Defining basic reading.** For the purpose of these investigations, the definition of basic reading was taken from the Basic Reading Skills Cluster of the Woodcock Diagnostic Reading Battery (Woodcock, 1997). Specifically, this includes letter-word identification and word attack. On the Woodcock Diagnostic Reading Battery, word identification involves the recognition of sight words, such as *get*, *was*, *part*, presented in isolation. Word attack involves the pronunciation of nonsense words (letter combination or pseudo words) such as *tiff*, *zoop*, and *dright*.

**The subjects.** The students in this study were children enrolled in a Saturday morning reading program at a Midwest university reading center. Testing was conducted on the first day of instruction as part of a pre-testing protocol. In all, 53 children were assessed using the sound blending and elision subtests from the CTOPP and the letter word identification and word attack subtests from the WRDB. The children ranged in age from 6 to 12 years. All assessments were administered and scored by graduate students enrolled in a literacy practicum experience.

**Results.** In order to determine correlations between the variables, means and standard deviations for the subtests and clusters were calculated. These are presented in Table 1.
As shown in Table 1, the children assessed in the first study displayed low average abilities in phonological awareness and below average abilities in basic reading. This is consistent with the fact that the students were enrolled in a program to enhance their basic reading skills.

Next, correlations between subtests were calculated. These results are presented in Table 2.
As shown in Table 2, significant correlations were seen among all tests and clusters. It was anticipated that correlations between CTOPP and WDRB tests would be significant. In further reviewing the data, it was found that elision correlated most strongly with word attack, whereas sound blending correlated most strongly with letter-word identification.

**Discussion.** The results are consistent with the concurrent correlation study reported in the CTOPP examiner’s manual (Wagner, et al., 1999). However, in that study, the CTOPP was correlated with the Woodcock Reading Mastery Tests-R. As in the present study, the correlations were significant, elision correlated to word attack (.74, p < .01) and to word identification (.53, p < .001). Blending words correlated significantly to word attack (.32, p < .01) but not to word identification.

In developing assessment protocols for intervention programs, it is important to utilize tests that are valid and reliable in the results they generate. In the first study, consistent with the studies previously cited, phonemic awareness was shown to be a significant factor in basic reading development. Thus, the supposition that PA should be assessed in intervention programs was confirmed, as it would appear the subtests from the CTOPP used in this study proved to be not only valid, but also a reliable indicator of word-level reading skills in these reading center children.

**Study 2.**

The second study (Opatrny, et al., 2000), in which existing diagnostic records were reviewed, sought to extend the first. Specifically, the objective of this second study
was to use regression analysis to ascertain which CTOPP subtests most impacted the total reading score on the WDRB. The WDRB uses four core subtests to calculate the Total Reading Score. These are Letter-Word Identification, Word Attack, Vocabulary, and Reading Comprehension. The core battery of the CTOPP consists of six subtests. In addition to the phonological awareness subtests of elision and word blending, the assessment includes two tests of rapid naming (digits and letters) as well as two phonological memory subtests (memory for digits and non-word repetition).

In order to select profiles for inclusion in the review, sixty case files were selected at random from diagnostic cases completed in 1999 and 2000. The first criterion for inclusion in the analysis was the age of the children assessed matched the children’s ages included in Study #1. The second criterion for inclusion was that the client was tested with both the CTOPP and the WDRB. Those in which one or the other was not administered were excluded. The first thirty files that met these criteria were selected.

Means and standard deviations were calculated as in the first study. Then, using the SPSS computer application, a step-wise regression analysis was completed using the WDRB total reading score as the dependent variable and the CTOPP subtests as the independent variables.

**Results.** The summary of means and standard deviations of the CTOPP and WRDB for the thirty reviewed cases is presented in Table 3.
Table 3.
Subtest scores for the CTOPP and WRDB

<table>
<thead>
<tr>
<th>Subtest/Cluster</th>
<th>Mean*</th>
<th>Standard Deviation</th>
</tr>
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<tbody>
<tr>
<td>(n=30)</td>
<td></td>
<td></td>
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<tr>
<td><strong>CTOPP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elision</td>
<td>8.17</td>
<td>2.81</td>
</tr>
<tr>
<td>Blending Words</td>
<td>7.90</td>
<td>2.41</td>
</tr>
<tr>
<td>Memory for Digits</td>
<td>8.97</td>
<td>3.07</td>
</tr>
<tr>
<td>Rapid Digit Naming</td>
<td>8.16</td>
<td>2.32</td>
</tr>
<tr>
<td>Non-Word Repetition</td>
<td>8.80</td>
<td>1.93</td>
</tr>
<tr>
<td>Rapid Letter Naming</td>
<td>8.16</td>
<td>2.15</td>
</tr>
<tr>
<td><strong>WDRB</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter-Word Identification</td>
<td>93.10</td>
<td>12.93</td>
</tr>
<tr>
<td>Word Attack</td>
<td>92.10</td>
<td>14.67</td>
</tr>
<tr>
<td>Reading Vocabulary</td>
<td>95.60</td>
<td>13.45</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>97.63</td>
<td>13.36</td>
</tr>
<tr>
<td>Total Reading</td>
<td>94.33</td>
<td>12.54</td>
</tr>
</tbody>
</table>

* Subtest expected means on the CTOPP = 10.0 (+/- 3).
* Subtest expected means on the WDRB = 100 (+/- 15).

A review of the scores presented in Table 3 demonstrate that the children assessed at the reading center generally do score in the low average range on both the CTOPP and the WRDB. This is generally expected of children being assessed for reading disabilities as previously cited.
Since the first previous study (Opatrný, 1999) had demonstrated strong correlations between the CTOPP and WDRB, a regression analysis was completed to further ascertain which subtests of the CTOPP might predict the total reading score on the WDRB. A significant finding in this regard would help to focus the intervention of these students as well as allow for fewer subtests to be administered. In fact, the regression ANOVA was significant for two predictors—Elision ($F=7.506$, $p = 0.011$) and Blending Words ($F=6.539$, $p = 0.005$).

These results of the regression analysis are presented in Table 4, follows:

Table 4.
Regression Coefficients for Significant Predictors

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (Unstandardized)</td>
<td>Std. Error (Standardized)</td>
</tr>
<tr>
<td>1    (Constant)</td>
<td>77.535</td>
<td>6.472</td>
</tr>
<tr>
<td>Elision</td>
<td>2.057</td>
<td>.751</td>
</tr>
<tr>
<td>2. (Constant)</td>
<td>86.757</td>
<td>7.454</td>
</tr>
<tr>
<td>Elision</td>
<td>2.857</td>
<td>.799</td>
</tr>
<tr>
<td>Blending Words</td>
<td>-1.994</td>
<td>.929</td>
</tr>
</tbody>
</table>

Dependent Variable: WDRB Total Reading

As shown in Tables 4, the Elision and Blending Words subtests from the CTOPP were shown to be significant predictors for Total Reading. Of the two, the Elision subtest appears to be the subtest having the greater prediction value on the total reading variable.
**Discussion.** In the second study, elision stood out as a significant predictor for total reading success. Since further analyses of the Center’s diagnostic profiles are ongoing, these results should be considered as preliminary. Still, these results appear to support the following conclusions:

1. Elision is a key element of phonological awareness.
   Of the elements evaluated by the CTOPP measuring phonological awareness, this one element has been consistently powerful in identifying children who have reading difficulties.

2. Elision predicts success in reading nonsense words more than real words.
   Since elision deals with manipulation of phonemes, it would make sense that children who can perform this task would do better at reading abstract pseudowords. Further study is needed to ascertain the range of influence that elision has over other reading skills and behaviors.

3. Elision may be an important element in the screening of reading success, albeit at the level of basic reading and broad measures of total reading.
   Teachers continually ask how they can quickly assess young readers who may be at difficulty for reading failure. It would appear that using elision tasks may be one answer to this question.

In summary, although further research will be conducted to investigate these findings, it would appear, at least for now, that the use of elision as a key element in reading assessment and diagnosis is a sound practice.
References


