READING SAMPLES AS PREDICTORS OF READING ACHIEVEMENT

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Abstract: Letter knowledge prior to reading instruction has consistently been shown to be the best single predictor of first grade reading achievement currently available. Recent investigators have used letter-related tasks and response frequency (rate) as a measurement unit to provide better predictors than instruments based only on accuracy of response. The present study used a 30-second sample on a letter-naming task in January to predict May oral reading rate and reading achievement scores for first graders. In addition, a concurrent prediction was made using one-minute performance samples on five basic reading skills in May to predict May reading achievement scores. Data from each of these questions indicate significant results.

The importance of early prediction or identification of learning problems in children can not be underestimated. There is a strong rationale and evidence in the literature supporting accurate early screening programs, and it will not be repeated here. Keogh and Becker (1973) have discussed problems associated with early prediction programs. One of the major problems is the accuracy of the predictions made. The purpose of this study was to assess the accuracy of prediction of first grade reading achievement from several direct measures of reading or pre-reading skills.

Selection of appropriate measures is critical to the accuracy of prediction instruments. In a review of studies concerning visual discrimination and first grade reading achievement, Barrett (1965) found that verbal visual-discrimination tasks (those related to letters, words or sounds) were better predictors than non-verbal tasks (those related to figures or designs). Bond and Dykstra (1967), in summarizing the results of the USOE First Grade Studies, reported correlations of .51 to .60 between letter identification and first grade reading achievement. They concluded that letter knowledge prior to reading instruction is the single best predictor of first grade reading achievement. This is the same conclusion drawn by Richek (1978) after reviewing the literature, and was supported by results from her study. It can be concluded from the above reviews and from a wealth of other information (e.g., DeHirsch, Jansky, & Langford, 1966; Mercer, 1979; Samuels, 1972), that a letter naming task is probably the single best predictor of first grade reading achievement currently available. It is important to note, as always, that correlation does not indicate a causal relationship. In fact, letter knowledge appears to be a g factor for reading, as Richek (1978) has indicated. Results obtained from training in letter names do not indicate improved reading ability (Jenkins, Bausell, & Jenkins, 1972; Ohnmacht, 1969; Samuels, 1972). This point does not weaken support for the use of letter naming tasks for large scale screening purposes. However, a distinction must be made between "screening" and "prescriptive assessment." Screening does not necessarily yield prescriptive information, and none should be expected. A screening program should use the most efficient and reliable instruments available to locate children with potential problems.

These children are then referred for detailed, prescriptive assessment. Haring, Lovitt, Eaton and Hansen (1978) make a similar distinction between "screening assessment" and "placement" data, although they use the term screening to indicate a more detailed individual evaluation.

In recent years the letter naming task has been modified to include a more precise measurement procedure. The rationale for the use of frequency measurement need not be presented in this Journal. However, it should be mentioned that studies using frequency of response on letter-naming tasks (Biemiller, 1978; Speer & Lamb, 1976; Magliocca, Rinaldi, Crew, & Kunzelmann, 1977) have generally shown higher correlations than those using traditional, accuracy-based measurement. In addition, Biemiller (1978) and Samuels, Begy, and Chen (1976) found that frequency of response on reading tasks consistently discriminates between good and poor readers. Strong evidence exists, then, to support the two major characteristics of the present screening study: (a) the use of a letter-naming task and other word related tasks, and (b) the use of frequency as a measurement unit.

METHOD

Subjects

All three of the first grade classrooms of an elementary school located in Gainesville, Florida were used for this study. This provided a total n of 55.

Procedure

In early January, a 30-second performance sample of naming lower case random letters was obtained from all the first graders and served as a predictor measure. In May, a one-minute performance sample was obtained on the following skills: (1) consonant sounds; (2) short vowel sounds; (3) short vowel-CVC words; (4) long vowel words; and (5) oral reading frequency (rate) from the first passage on the Gray Oral Reading Test. The first 4 samples served as concurrent predictors, while the last sample served as both a concurrent predictor and a criterion measure. The Metropolitan Achievement Test (MAT) was also administered in May, with the total reading score used as a criterion measure.

This study was conducted as part of a larger project designed to assess the effect that direct practice in phonics has on reading. The phonics study will be described in a subsequent paper. However, because of treatment effects, results of this prediction study are presented separately for the control group, which had no additional practice. This fact, and missing data for some subjects resulted in a useable n for this study of 29 for question 1, and 37 for question 2.

RESULTS

Data are presented concerning two questions. First, can letter-naming frequency in January predict oral reading frequency and reading achievement in May? Second, can a frequency measure on one or more reading skills in May predict May reading achievement? The first question was answered using a frequency distribution on the Standard Behavior Chart and regression analysis. For the second question, two additional frequency distributions and the "Stepwise" multiple regression procedure

available in the SAS program (SAS Institute, Inc., 1979) were used. This procedure finds the single best predictor of the criterion variable, then successively builds the best predictive model for that variable. R^2 values are obtained by squaring the Pearson correlation coefficients. This squared correlation coefficient indicates the proportional reduction in the error variance as a result of adding each variable to the model.

To answer the first question, a frequency distribution of letter-naming frequency, the January predictor, was grouped by 3 levels of 2 criterion measures: (1) below, at (1.8 to 2.0) or above grade level on the total reading score of the Metropolitan Achievement Test (MAT); and (2) less than 40 words per minute (w.p.m.), 40-80 w.p.m., and more than 80 w.p.m. oral reading frequency on the Gray Oral Reading Test. Chart 1 illustrates these distributions.

Correlations and r^2 values between the predictor and the criterion measures are listed in Table 1.

Table 1

Correlations and r^2 values for January Letter-Naming to May Reading Measures

	Total Reading Achievement Score (MAT)	Oral Reading Frequency (Gray)
r	.82*	.65*
r^2	.67	.42

*n = 29, p <.01.

Results related to question 2 concerning concurrent predictors are presented in Chart 2 and Table 2. The first distribution in Chart 2 is the best May predictor, short vowel CVC words, and the second is oral reading frequency on the Gray Oral Reading Test. Both distributions were grouped by 3 levels of the total reading achievement score on the Metropolitan Achievement Test (MAT).

Multiple squared correlations between the May performance samples and MAT total reading achievement score are listed in Table 2. It can be seen that the first variable (short vowel-CVC words) accounts for most of the variance. While the other variables have high simple correlations, they do not add much to the variance reduction.

Table 2

Squared Multiple-Correlation Coefficients for May Performance Samples to May Total Reading Achievement Score (MAT)

Total r^2 at each Step				
Step 1	Step 2	Step 3	Step 4	Step 5
CVC	VOW	ORF	CON	LV
.70*	.725	.731	.735	.735

CVC--short vowel CVC words
VOW--short vowel sounds
ORF--oral reading frequency (GRAY)
CON--consonant sounds
LV--long vowel sounds
*p <.05

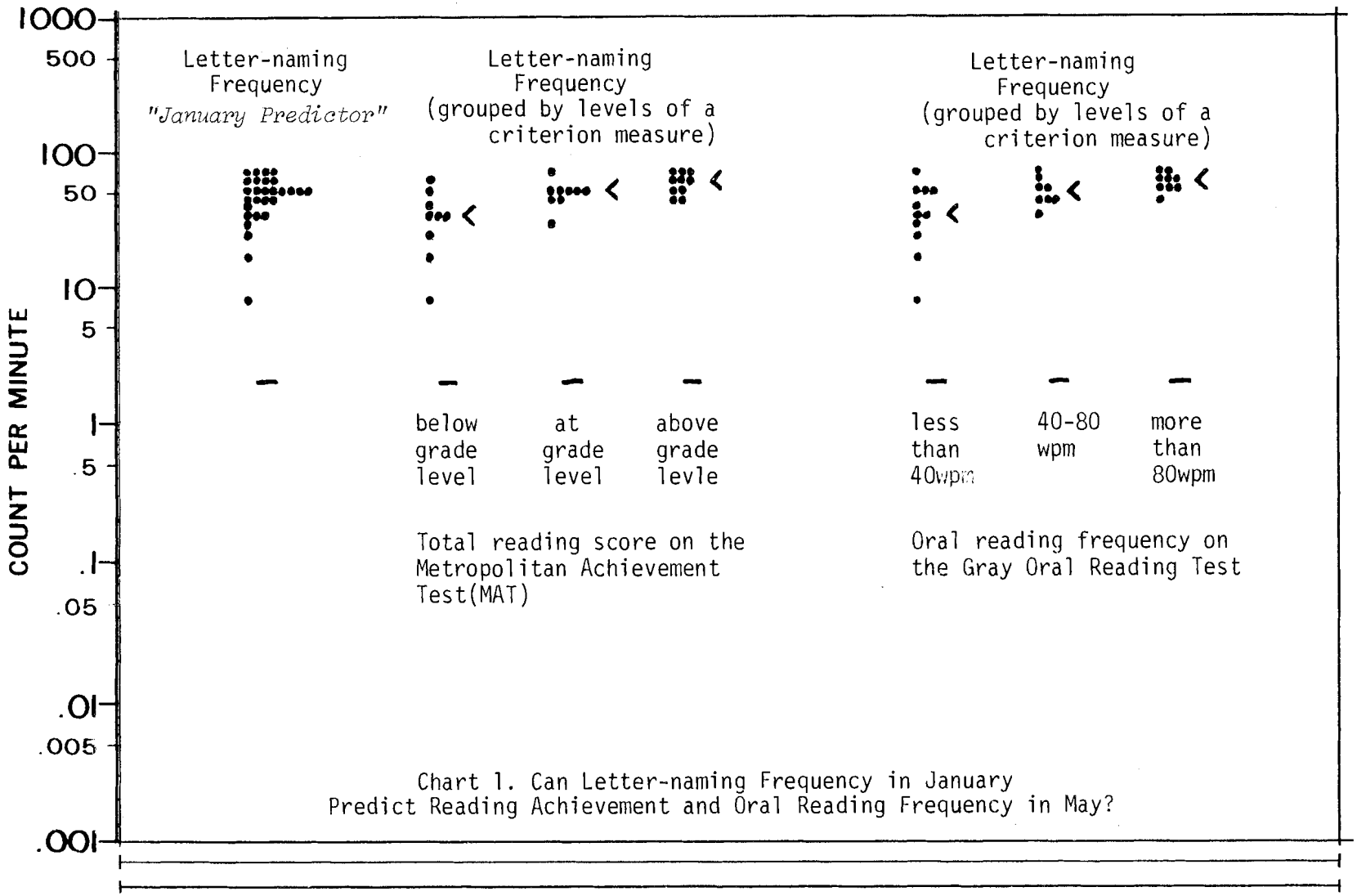

Chart 1. Can Letter-naming Frequency in January Predict Reading Achievement and Oral Reading Frequency in May?

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E. BERQUAM | 29 FIRST GRADERS | SEE-SAY | LETTER NAMES

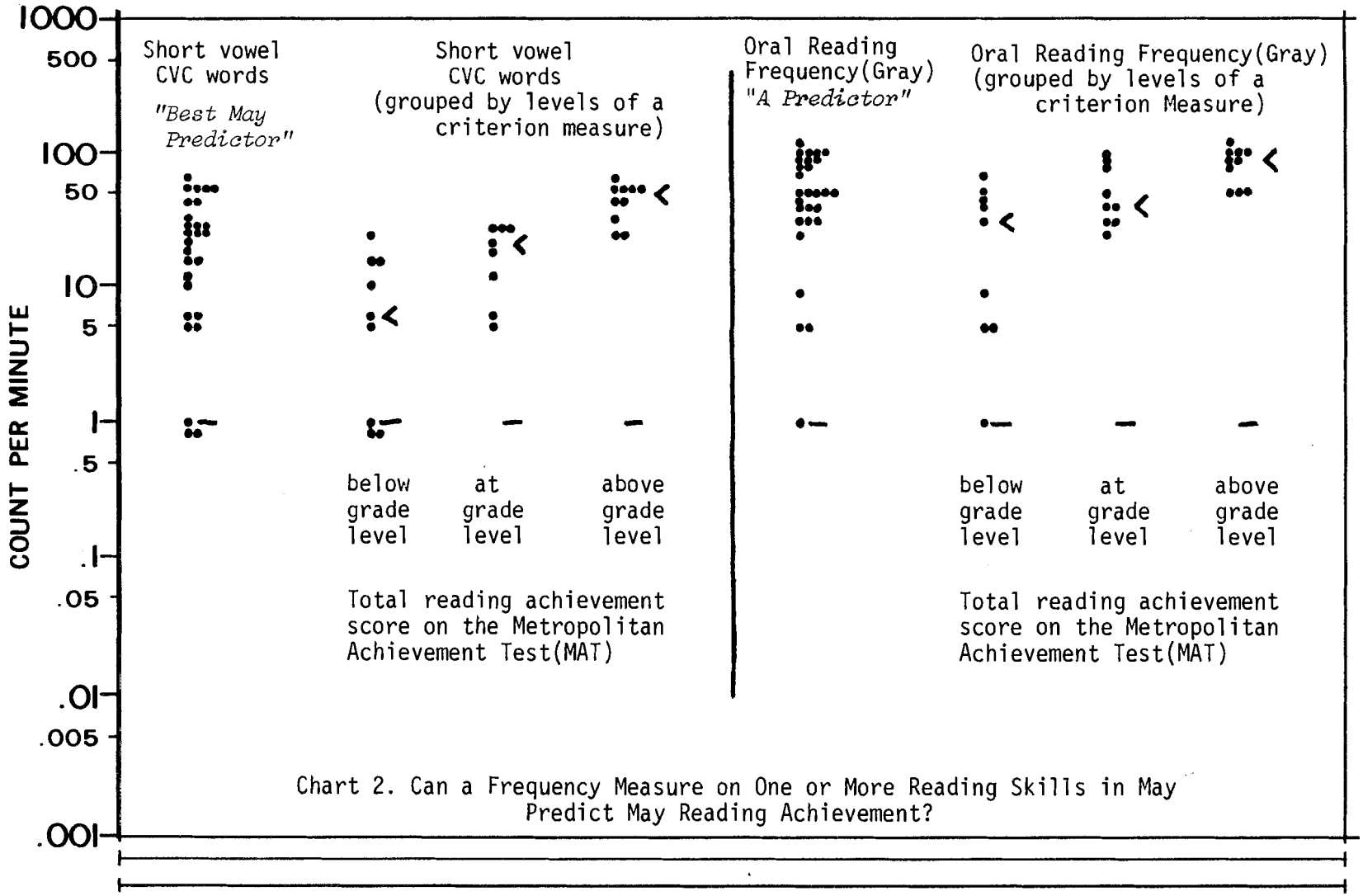

Chart 2. Can a Frequency Measure on One or More Reading Skills in May Predict May Reading Achievement?

Berquam, Eugene M. and Siders, Jane Z. Reading samples as predictors of reading achievement. *Journal of Precision Teaching*, Volume I, Number 2, July, 1980.

E. BERQUAM | 37 FIRST GRADERS | SEE-SAY

SHORT VOWEL CVC WORDS/ WORDS(GRAY)

DISCUSSION AND CONCLUSION

Several general conclusions may be drawn from this study. First, direct measures of reading or pre-reading skills can be reliable predictors of reading achievement. These types of tasks can be used for quick and efficient school-wide screening, when the purpose is to locate children with possible reading problems. This screening operation would be considerably more efficient, in terms of cost, time, and results, than many of the longer, more traditional screening instruments. The second conclusion is that frequency (rate) is further validated as a useful measure of reading proficiency. This finding is in agreement with Biemiller (1978), who found that 49-96 percent of the variance in reading scores on the Metropolitan Achievement Test was accounted for by response frequency (rate) on letter names, words, and oral reading.

Several limitations should be mentioned. The sample used for this study was small, and may not be representative of all first grades. Also, other reading related tasks may prove to be better predictors than the ones chosen here. There are two main criteria for task selection. First, the tasks should be direct measures relevant to a specific curriculum. It may be that different skills would need to be sampled for each different reading series. Second, the performance measure should be frequency. This measure provides the sensitivity and range in scores necessary to best discriminate between proficient and non-proficient students.

One final caution needs to be mentioned, concerning the choice of achievement test scores as criterion variables. The inherent weaknesses of norm-referenced tests and the instability of their scores undoubtedly contribute to a decrease in the accuracy of prediction studies such as this one. It seems logical, then, that we consider the use of direct measures of school performance as criterion variables. Data such as presented in Chart 1 and Table 1 where the letter-names score was used to predict the oral reading rate, may be more useful. Also, we should perhaps evaluate the efficiency of achievement tests in predicting direct performance measures.

At a time when educators are required and expected to conduct school-wide screening to identify children with learning problems, there is much evidence, both within our own "precision" area, and in the traditional literature, to support the development of screening programs such as that described here. Educators proficient in precision teaching procedures are in a unique position to provide leadership and expertise to the rest of the profession in this area.

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