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READING EXPECTANCY FORMULAE— STRENGTHS AND LIMITATIONS TO BE CONSIDERED

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Reading expectancy formulae and intelligence tests are two instruments with which the reading teacher is very familiar. However, the designs of both reading expectancy formulae and intelligence tests have incorporated various strengths and limitations into each. When the two are combined to determine a child's level of expectancy, much distortion in prediction may occur if careful selection and evaluation of these instruments are not executed. A critical look at the popular reading expectancy formulae and related use of intelligence tests will show that there are beneficial uses of reading expectancy formula in general but that there are also valid reasons which substantiate the need for caution when dealing with these formulae.

The Intelligence Factor

One of the basic premises related to the determination of a child's reading expectancy is that a child's reading ability is closely related to his mental ability. The mental ability, often expressed in terms of mental age or IQ, has become a common factor of the various reading expectancy formulae. However, attaining a precise and valid evaluation of a child's mental ability is not an easy task. There is such a wide variety of methods to use, each with its own biases and weaknesses, that the mental ability factor is the most questionable component of these formulae. This element alone could invalidate any of these formulae.

There are four major types of mental ability tests. The verbal group mental tests are probably the most misleading when used to determine a child's expectancy. A verbal group mental test is not an accurate measurement tool for poor readers or children of culturally different or culturally disadvantaged backgrounds. Generally, blacks test lower than whites, rurals test lower than urbans, bilinguals test lower than monolinguals, and low socioeconomic children test lower than high socioeconomic children. The second type of mental tests, the nonverbal group mental tests, tend to depress cultural bias, but they do not measure the specific abilities needed for success in reading. The individual mental tests are probably the most widely used, but again the poor reader does not fare well on these tests. Problems with vocabulary, abstract words, and sentence structure may result in a five to twenty point underestimation of a child's IQ score. The individual performance mental tests have very limited usage, being used mostly with children who are visually or auditorally handicapped. As in the nonverbal mental tests, the verbal skills necessary to

reading achievement are not tested.

The limitations discussed above are simple and obvious. When an attempt is made to use such test scores in predicting a child's reading ability, the criticism of these tests becomes more vehement.

In *Investigating the Issues of Reading Disability*, Spache presents several reasons why expectancy should not be based on IQ test results. He finds that different IQ tests vary greatly in the measurement of and relevancy to the process of reading. The methods of teaching reading which are used with a child can influence his reading progress more than his mental ability will influence this progress. Furthermore, the IQ tests falsely assume that all types of reading skills develop at the same rate. Spache also feels that group tests do not elicit the best possible performances from children. Further inaccuracies occur because most evaluators tend to overlook the standard error of measurement which is present in any such type of evaluation.

Strang has her own reasons for advising caution when using IQ tests to predict reading expectancy. She regards the IQ score as an inconstant factor. Such a score represents how someone is functioning at a particular point in time. An individual's score can vary from test to test and from year to year. Realizing that coaching can raise one's IQ score further augments its sense of instability. She also notes that IQ tests become increasingly invalid with children above the age of 13. Strang sees intelligence tests as poor assessors of a child's reading ability. A child can do well on an IQ test but have very poor reading proficiency. His ability to visually and auditorally decode, associate, and encode might not be evaluated on a mental test. Other necessary skills such as recalling detail and main idea, seeing relations, following directions, and solving practical and theoretical problems may never be measured on an IQ test but may be vital to reading performance.

Some defenders of the use of IQ tests refute that last argument and say that the intellectual activity required on an IQ test and the reading process itself are very similar. They also believe that both require convergent, divergent, and critical thinking. The strength of each of these two opposing arguments would be highly dependent on the particular mental test used.

One of the hardest defences to dispute regarding the use of IQ tests in determining a student's reading expectancy is the fact that only those students with a certain level of mental ability can profit from a remedial reading program. If a child is functioning at a very low level, but he also has a very limited mental ability, all the remediation in the world is not going to bring him to a performance level above his mental ability level.

Just as reading specialists differ in their opinions of IQ tests, those who have developed reading expectancy formulae vary widely on the use and weight of the mental ability factor. A closer look at these formulae will show some other interesting differences as well.

Reading Expectancy Formulae

Most reading teachers are familiar with the Bond and Tinker Reading Expectancy Formulae:

$$\begin{array}{l} \text{(Number of Years} \\ \text{in School)} \end{array} \quad \times \quad \frac{\text{IQ}}{100} \quad + 1 = \text{Reading Expectancy}$$

These authors place much importance on a child's mental age, regarding the IQ as an index of learning rate. A significant difference between mental age and reading age indicates that a child is a disabled reader. Bond and Tinker's strongest selling point of their formula is that it is extremely easy to calculate. All the data needed to calculate it should be readily available to any classroom teacher. The statistical research Bond and Tinker have to support the validity of their formula shows a high correlation between the formula's predictions and actual observed levels of achievement. Hence, it appears to be a useful and accurate device for determining one's potential.

"Not so!" say the critics. First of all, Bond and Tinker's "+ 1" factor assumes that all children entering first grade are all equally ready to begin reading. They totally disregard the effects of one's level of intelligence during the six years preceding the child's entrance into first grade. Another weakness arises when errors are made by teachers mistakenly inserting into the computation a child's grade instead of his number of years in attendance. Also, the "Number of Years in School" factor falsely assumes that a child retained one year makes a year's progress during the year of retention, whereas research shows that children who have been retained are farther behind in development than their peers who had the same weaknesses but were promoted. Finally, the Bond and Tinker formula is an inaccurate measure for children out of the normal IQ range (90-110). It sets extremely low standards for children with high IQ's. It follows that even if a student with a high IQ was working well below grade level, he would probably be able to attain the low expectancy set for him and thus not be labeled a disabled reader. He would not be referred for remediation despite the fact that he may in reality need it and would indeed be the one to profit from it.

The Harris formula, $\text{Mental Age} - 5 = \text{Reading Expectancy}$, also loses its validity when predicting potentials for children whose IQ's vary two or more standard deviations from the norm. By the Harris formula a child with an IQ of 170 in the middle of second grade would be expected to read on an eighth grade level. A child in that same class with an IQ of 60 would be expected to be no more advanced in the area of reading than a nursery schooler. The Harris formula does for the low IQ student what the Bond and Tinker formula does for the high IQ student. It allows him to easily achieve a low expectancy and accordingly appear to be working up to potential. Again the door to remediation is shut due to the shortcomings of a formula.

Horn's formulae are much more complicated than any of the others. The four formulae are:

$$\text{Age } 6 - 8.5: \quad \frac{\text{MA} + \text{CA}}{2} = \text{Reading Expectancy}$$

$$\text{Age 8.6 -- 9.9} = \frac{3MA = 2CA}{5} = \text{Reading Expectancy}$$

$$\text{Age 10 -- 11.11:} \frac{2MA + CA}{3} = \text{Reading Expectancy}$$

$$\text{Age 12 and up:} \frac{3MA + CA}{4} = \text{Reading Expectancy}$$

The assumption underlying these formulae are that mental and chronological ages are of equal importance for beginning readers and that the mental age becomes increasingly important in older children. Horn believes that the differences in the weighting of the mental and chronological ages allow for a child's development and maturation. When compared to the Bond and Tinker formula and the Harris formula, the Horn formula tends to predict less distorted expectancies. The most common criticism of these formulae are that they are too difficult to remember for handy use.

Wanting to get away from such complicated formulae that are so vulnerable to errors in calculation, Beverly Young proposed an extremely simple formula:

$$\text{Grade in School X IQ}^* = \text{Reading Expectancy}$$

*IQ must be written as a decimal

She not only reduces the chance of error in computation, but she also avoids Bond and Tinker's false assumption that the number of years spent in school is a measurement of progress. The biggest advantage of this formula is its simplicity. Any classroom teacher can easily remember it and use it. Since this is a relatively new formula, it has not yet proven its validity. Only through a comparative study of the application of this formula and data relating student achievement will we be able to get an estimate of its validity and usefulness.

Use of Reading Expectancy Formulae

There are several practical uses for any of the various reading expectancy formulae. Initially, the classroom teacher can use such a formula to determine if there is a significant discrepancy between a child's reading achievement and his reading potential. If there is, a recommendation for the disable reader to receive remediation can be made. As mentioned before, the child must have adequate mental ability to profit from such help.

More specifically, reading teachers may resort to the use of such formulae as a screening device when there are more candidates for remedial help than can be serviced by a particular program. Also, the results of these tests can give a "rank order" of the severity of the disabilities which will be dealt with in a remedial program. The results can also help the specialist group together the children who have similar degrees of disability. The

reading teacher can later use the information obtained from the formula as a post-evaluation measure, noting whether or not a child has been brought any closer to his potential.

On a broader basis, reading expectancy formulae may be used to judge whether or not a school's overall achievement levels are closely correlating to the reading abilities of its students. A school system can check the effectiveness of its reading program. Is the reading program setting realistic goals for its students? Does the reading program need development or improvements of any kind?

Whether it is one reading teacher or an entire school system which is going to use a reading expectancy formula, the following generalizations must be considered:

- 1) The number of children labeled disabled will vary with the formula which one uses and one's particular definition of reading disability.
- 2) The formula chosen for use will depend on what types of data are available.
- 3) Each formula can only be as accurate as its instruments.
- 4) A child's specific reading deficiencies will not be revealed through the use of such a formula.

John Pescosolido and Charles Gervase, authors of *Reading Expectancy and Readability*, state that using one or more formulae in predicting reading expectancy produces contradictory and baffling results. They compared nine hypothetical cases scored by four different reading expectancy formulae, and they found only two scores out of all those estimated to agree. In fact, sometimes the same reader was rated anywhere from above average to disabled, depending on the formula used. The implications here are obvious and a bit frightening.

There is a plethora of variables which influence a child's level of achievement which must be taken into consideration when assessing his potential: sex, race, native language, neurological status, intersensory integration, educational background, socioeconomic factors, physical ability, and emotional status. A child's interests, work habits, and attitudes must be observed. So much must be examined for a specialist to obtain a true profile of a child's abilities and potentials.

In conclusion, it seems obvious that the validity of each formula is questionable and subject to criticism. The user of a reading expectancy formula should be familiar with the various methods of prediction and aware of the conflicts in results when various methods are applied. The user must have as recent and as accurate as possible instruments and data at his disposal. Each formula should be used conservatively as a general, approximate estimate of a child's potential. Caution and fairness are necessary if the child is to be spared undue pressures and be allowed to benefit from the use of these formulae. After all, the ultimate goal in the design and use of these formulae is to help each child reach his own true potential.

REFERENCES

- Bond, Guy L. and Miles A. Tinker. *Reading Difficulties: Their Diagnosis and Correction*. New York: Appleton Century Crofts, 1967.
- Harris, Albert J. *How to Increase Readability*. New York: David McKay Co., 1970.
- Rodenborn, Leo V. "Determining, Using Expectancy Formulas." *Reading Teacher*, Vol. 28, (December 1974), pp. 286-290.
- Spache, George. *Investigating the Issues of Reading Disability*. Boston, Mass.: Allyn and Bacon, Inc., 1976.
- Strang, Ruth. *Diagnostic Teaching of Reading*. New York: McGraw-Hill Book Co., 1964.
- Wilson, Robert M. *Diagnostic and Remedial Reading for Classroom and Clinic*. Columbus, Ohio: Charles and Merrill Publishing Co., 1972.
- Young, Beverly S. "A Simple Formula for Predicting Reading Potential." *Reading Teacher*, Vol. 29, (April 1976), pp. 659-661.