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Measuring Reading Abilities:

concepts, sources and applications

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Preface

I have been greatly helped in the preparation of this book by the comments on specific sections made by my colleagues in the Department of Education and the Colleges of Education Division of the Faculty of Education at the University of Manchester. In particular, I am indebted to Dr D. G. Lewis, Dr T. Fitzpatrick, Dr C. D. Elliott, Mr D. Murray and Mr J. Ryan.

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I have been fortunate in obtaining the cooperation of many practising Educational Psychologists and Remedial Education Organisers throughout England and Wales. They have enabled me to carry out a survey of the availability of in-service courses concerned with the uses of reading tests. I was also able to investigate the extent to which individual Local Educational Authority Schools' Psychological Services and Remedial Education Services have pertinent

materials on tests and testing available to teachers. Reference to the findings is given briefly in the text.

While this work has been greatly facilitated by all of the above, I acknowledge especially the encouragement and help given to me by Professor John Merritt of the Faculty of Educational Studies at the Open University. The responsibility for the book as it is presented, however, is mine alone.

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Contents

1. Introduction: basic concepts

The appropriate use of reading tests can contribute towards improving the standards of literacy of our children, yet the uses of reading tests are frequently under- or over-valued by teachers. Often, this is a consequence of a restricted appreciation of the conceptual bases, sources and legitimate applications of reading tests.

There is a vast variety of reading tests available. The most important British reading tests and some interesting overseas ones have been surveyed in a recent United Kingdom Reading Association (UKRA) monograph (Pumfrey 1976). While this book and the monograph have a related theme, each can be read independently.

To use reading tests effectively, it is essential that the user has considered the topics which form the titles of the chapters in this book. Teachers are the most frequent users of reading tests. This book has been written as an introduction to the field for the non-mathematician who is interested in the role of measurement in the teaching of reading. For those wishing to pursue the ideas presented here, ample references are provided.

It has been said that whatever exists, exists in some quantity and can in principle be measured. More important in so far as reading is concerned, measurement can usefully be undertaken in both the pupils' and their teachers' interests. The writer agrees with the principle stated by Lord Kelvin, who once said: 'When you can measure what you are speaking about and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind.'

Some twenty-three years ago Guilford, an eminent psychometrician, commented that 'No other contribution of psychology has had the social impact equal to that created by the psychological test. No other technique and no other body of theory in psychology has been so fully rationalised from the mathematical point of view.' Yet quantification by itself is not enough. Figures can be used as a

smokescreen to obscure our lack of understanding and control of the reading process from ourselves and others, wittingly or otherwise, unless we are aware of the limitations both of mental measurement and of our conceptualisation of the reading process.

What is reading?

At a recent in-service course on the teaching of reading, one discussion centred on the question 'What is reading?' Considerable differences of definition were found within the group. In part these variations were related to the ages of the children taught (from nursery to secondary level) and to the teaching experience of the teachers, who ranged from first-year probationers to those with many years' experience.

Definitions of reading have changed markedly over the last fifty years as our knowledge of the reading process and of child development has increased. Yet an understanding of the nature of the reading process, and some attempt at definition, is essential if our teaching procedures and assessment techniques are to be adequate. The reading process is more than a simple mechanical skill whereby, say, the presentation of a flash card to an infant school child elicits the appropriate oral response from the child. It is more than the ability to understand the explicit meaning of the passage presented. It is, in essence, a constructive thinking process which includes comprehension of explicit and implicit meaning. It involves application, analysis, evaluation and imagination. *Reading is a process that requires thought.* It is one activity through which the child's cognitive development can be furthered (Stauffer 1969; Walker 1974).

The reading process is also characteristically developmental and the relative importance of component skills at a given stage in this process can vary considerably. In practice, it is sometimes assumed by junior school teachers that most children should have acquired the necessary basic competence in reading by the end of their infant school careers. The work of researchers such as Morris (1966), Goodacre (1967, 1968), Gardner (1968), Clark (1970), Davie *et al.* (1972) and many large-scale local surveys carried out by Schools' Psychological Services and Remedial Education Services throughout the UK have shown this assumption to be false (Vernon 1971; Moseley 1975). At a more fundamental level, if the teacher is faced with a typical first-year junior school class, the existence of children who find difficulty in mastering reading skills has a more striking impact than any research report.

We also know that at the top of the junior school, at the fifth year of secondary school education, and at all ages between, there are large numbers of children who have difficulty in reading at a level likely to be of any practical use or to give them any pleasure. A national survey carried out by the National Foundation for Educational Research (NFER) on behalf of the Department of Education and Science (DES) gives some indication of the extent of the problems (Start and Wells 1972). The secondary school teacher faced with a group of 'slow-learning' children needs no such survey to convince her of the nature and extent of the problem and its urgency.

There is evidence that a *laissez-faire* attitude towards the aims, methods and assessment of the reading programmes in many schools disregards what is known about the developmental nature of reading abilities and sound teaching practice. This results in a failure to maximise for many children the opportunity of achieving literacy by the end of their formal education.

The setting up by the DES of the Bullock Committee on 'Reading and the uses of English' was a recognition of concern in this area. Of the 333 recommendations made in the Bullock Report, seventeen are picked out for special mention (DES 1975). Of these, at least four stress the importance of the use of tests in the monitoring of standards of literacy and in the diagnosis and treatment of reading difficulties. Quoting from the recommendations:

'1. A system of monitoring should be introduced which will employ new instruments to assess a wider range of attainments than has been attempted in the past and allow new criteria to be established for the definition of literacy.'

'6. There should be close consultation between schools, and the transmission of effective records, to ensure continuity in the teaching of reading and in the language development of every pupil.'

'9. LEAs and schools should introduce early screening procedures to prevent cumulative language deficit and reading failure and to guarantee individual diagnosis and treatment.'

'11. There should be a reading clinic or remedial centre in every LEA, giving access to a comprehensive diagnostic service and expert medical, psychological and teaching help. In addition to its provision for children with severe reading difficulties the centre should offer an advisory service to schools in association with the LEA's specialist adviser.'

In chapters on 'Standards of Reading', 'Monitoring', 'Screening,

Diagnosis and Recording' and 'Children with Reading Difficulties' the vital role of tests as important sources of information for the teacher is stressed. The many constructive suggestions for helping teachers acquire the necessary competence to use this information are welcomed.

That much still remains to be done to implement even the above recommendations can be gathered from the findings of a survey carried out one year after the publication of the Bullock Report and to which ninety-six of the one hundred and eight LEAs in England and Wales replied. Of these authorities, only fifty-one claimed to have a formal system for screening all primary school children for language and reading difficulties. Seventy-five had either reading clinics or remedial centres for the diagnosis and teaching of children with language and reading difficulties (Makins 1976).

What is a reading test?

A reading test is a public means of collecting and quantifying information concerning the extent to which a child has mastered a given skill in, or acquired a particular attitude towards, some aspect of reading. The judicious selection and organisation of the material comprising a test enables the tester to obtain this information economically in terms of both his and the pupil's time. Reading tests are efficient means of obtaining reliable assessments that are valid for particular purposes. As we shall see, such information is potentially of great value to the teacher.

Measurement

Teachers generally are aware that the instruments used in the measurement of mental abilities have distinctive characteristics. The process involved is not the same as, say, measuring the height of a table with a ruler. To appreciate the import of this difference, we must briefly consider the nature of measurement: the assignation of numerals to objects or events according to rules.

For our purpose, four different levels of measurement can usefully be distinguished. In ascending order of the amount of information they can carry, these are: (i) the classificatory or nominal scale, (ii) the ranking or ordinal scale, (iii) the interval scale, and (iv) the ratio scale. Each scale has different formal properties and these determine the ways in which data at a given level of measurement can be manipulated (Siegel 1956).

The lowest level of measurement exists when categories such as numbers or other symbols are simply used to classify people, events or observations. For example, ethnic group classification is a nominal categorisation. The grouping of children in an unstreamed school according to their class teacher's initials is another. In each example, the classification of observations indicates the set of mutually exclusive sub-classes to which an observation belongs. Classifying readers as being, or not being, library users is a further example of measurement at this relatively weak level.

At a higher level, the ordinal scale of measurement is one much favoured by teachers. Children are still frequently ranked according to their reading attainments. Each observation at this level implies more than just being the same as, or different from, others and thus goes beyond what is required to classify on a nominal scale. Each stands in a hierarchical relationship to the others, being greater than, preferred, superior (or equal) to them (or the reverse). The distance or amount between rankings is not, however, known. For example, we merely know that John reads given material more accurately than Mary. The extent of the superiority cannot be assessed from their rankings. Despite this limitation, teachers find rank orders of considerable use in discussing the relative reading attainments of their pupils.

The interval scale has all the characteristics of the ordinal scale, but in addition the distances between any two numbers are of a known size. Such a scale is typified by a constant and common unit of measurement and accords a real number to all pairs of observations in the ordered set. At this level the ratio of any two intervals is independent of the unit of measurement and of the zero point. Commonly temperature is measured on an interval scale. Whether we use the centigrade or Fahrenheit scale is entirely a matter of choice. Each contains the same information. Although the scales have different zeros and different units of measurement, the *ratio of the differences between two pairs* of readings on the one scale is identical to the ratio between equivalent differences on the other. In such scales the zero point and the unit of measurement are arbitrary.

On the assumption that reading abilities are normally distributed in the individuals being tested (see p. 97), the distances between the frequencies of any two observations are known theoretically. The reading test constructor, then, is able to select test items until the presupposed normal distribution appears in the distribution of children's scores on the reading test. He thus obtains an interval scale. The interval scale is the first really quantitative level of measurement.

At a higher level, the ratio scale has all the characteristics of the interval scale, but also has a true zero. Thus length is an example. The ratio between any two lengths is independent of the unit of measurement. If we measure the lengths of two different pieces of wood in inches and then in centimetres, we would find that the ratio of the two measurements in inches would be identical to the ratio of the two measurements in centimetres.

The majority of standardised tests of reading claim to achieve measurement at the interval scale level. No conventionally standardised reading test achieves measurement at the level of a ratio scale. This is, in part, because of the theoretical and practical difficulty in specifying zero ability.

Objectives, assessment and teaching

The main functions of the teaching of reading are to bring about changes in the child's level of competence in, and attitudes towards, reading. It is accepted that this cannot be done in isolation from the rest of the educational programme (Merritt 1971). However, the focus of this book is deliberately narrowed to reading only. The types of change which the teacher expects to achieve constitute the goals of the reading programme arranged for her pupils. Thus the teacher at any level is concerned with the following related tasks in the teaching of reading:

1. the *assessment* of the child's current reading skills;
2. the *specification of reading objectives* which it is anticipated will be achieved by the child;
3. the *arrangement* of a pattern of learning experiences which will facilitate the child's achievement of the objectives;
4. the *assessment* of the degree to which the objectives of the reading programme have been achieved; and,
5. dependent upon the teacher's interpretation and evaluation of the results obtained, repetition of the cycle.

It is a legitimate concern for the teacher to use methods of assessing reading abilities that can provide a sound basis for describing, interpreting and evaluating the outcomes of her reading programme. Reading tests of markedly different types, designed to meet very different purposes, offer ways of meeting the teacher's needs in this respect. They also further the teacher's understanding of the reading process (McLaughlin 1966; Pumfrey 1976).

The teacher as tester

Reading is one aspect of the language arts or skills. Its teaching is recognised as an important function of the staff of schools in our society. The efficiency with which teachers can help children acquire the many inter-related skills involved in reading varies greatly. It is to a large extent dependent upon the individual teacher's knowledge of child development, the clarity with which the goals of the reading programme are expressed, teaching techniques, and her ability to use and interpret the results of various types of testing procedure. The testing of children's reading skills and attainments is not an end in itself, but is one means of promoting better reading.

'I've never needed to use a reading test in all my years of teaching reading.' So said a teacher who was patently competent at helping children learn to read. In fact, anyone observing her at work would realise that with individual children she was constantly applying highly effective *informal* tests of the child's mastery of reading skills. As a result of the information obtained in this way, she modified the content and sequence of learning experiences to which the child was exposed. This teacher mistakenly identified the process of testing solely with the administration of a particular type of standardised reading test. *Teaching and testing are complementary functions in efficient education.* They cannot be divorced.

The testing of reading is no more than the careful sampling of one important aspect of a child's behaviour related to language and thinking. This sampling can be done intuitively or formally. Both approaches are important, although this book is primarily concerned with the second, formal approach. The systematic testing of reading enables the teacher to assess whether or not a child's progress is appropriate in terms of accepted educational goals in this area. If it is not, the teacher needs to generate ideas as to the reasons why a child is failing. She must then decide what educational intervention or experience is likely to facilitate the child's progress. Even the exceptionally competent teacher of reading is likely to become more effective if she is aware of the time that can be saved in identifying a child's weaknesses and/or strengths in reading skills through the use of formal and systematic rather than intuitive testing.

Many teachers are unaware of the different types of reading tests that are available and of their possible uses and limitations. The restricted aims of this book are five-fold. Firstly, to present a rationale for the systematic use by the teacher of various types of reading tests, particularly standardised ones. This applies to reading

programmes at any level from the infant school upwards. Secondly, to discuss some of the important concepts related to the effective use of reading tests. Thirdly, to describe some of the major sources of reading test information currently available. Fourthly, to discuss the principles of reading test administration and the nature of the results obtained. Fifthly, to consider some important dimensions of reading test interpretation and applications.

To this end the titles of the eight chapters of the book are topics which any potential user of reading tests needs to consider if she is to use tests effectively.

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2. Why test reading?

The teacher's view

From the point of view of the teacher, the testing of reading must help her to maintain and improve standards of attainment in and attitudes towards reading of the children for whom she has professional responsibility (Farr 1970). Such attainments and attitudes can be measured with known degrees of precision. The information from reading tests can contribute towards the attainment of the objectives of reading instruction by helping the teacher in the following seven ways:

1. *To maintain and improve standards in reading*

Testing children's reading attainments and attitudes focuses the teacher's attention on standards both within the class from year to year and also between schools. Using tests, it is possible to know whether or not reading standards in a given situation are rising, falling or stationary. To do this, it is essential that appropriate records are kept.

2. *To compare the reading skills and attitudes of pupils within a class*

Objective tests of reading skills and attainments can discriminate reliably between the abilities of children within a class. If it is considered educationally desirable to group children for reading instruction so that a group has either a very narrow or a very wide range of reading ability, reading test results can provide the necessary information. Though tests of attitudes towards reading are less refined, there are some promising approaches (Pumfrey and Dixon 1970).

3. *To measure progress in reading*

Reading tests enable a teacher to establish a baseline from which the progress of the individual or the group can be measured and evaluated. Most teachers think of improvement as the difference between test scores at the start of reading teaching and those at the end. This is but *one* way of assessing progress, and it has some advantages. But there are at least *five* different ways in which progress in reading can be estimated. All have varying strengths and weaknesses (Davis 1970).

4. *To evaluate various approaches to the teaching of reading*

Reading tests can be used to examine the effects of any innovation in the teaching of reading that the teacher may make. For example, many schools were concerned in the various Initial Teaching Alphabet investigations. The teachers involved will be aware of the use of reading tests in comparing the short-term and long-term effects on children's acquisition of reading skills using either i.t.a. or traditional orthography (t.o.).

5. *To diagnose reading difficulties*

The aim of the diagnosis of reading difficulties is to determine the nature of the process by looking carefully at the functional relationships between its different aspects. Diagnostic reading tests enable the teacher to locate the child's particular skill deficiencies. This is an essential first step in alleviating the adverse effects of such deficiencies on his reading attainments. For the teacher, the major focus in the use of diagnostic reading tests is to gather information that will help in planning a reading programme for the child. Such a programme will capitalise on strengths and also help to improve skills found to be weak (Tansley 1967; Della-Piana 1968; Harris 1970; Dechant 1971; Pumfrey 1974).

The *Concise Oxford English Dictionary* defines diagnosis as 'Identification of disease by means of patient's symptoms'. Drever (1964) extends this to 'Determination of the nature of an abnormality, disorder or disease'. The use of the concept of 'diagnosis' in the context of the investigation of children's reading difficulties is controversial. This is, in part, due to disagreement as to whether the medical model implicit in the term is appropriate to education. It is feasible that inter-individual differences in reading skills or