

# Some problems in determining the prevalence of dyslexia

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## **Abstract**

Any figure given for the prevalence of dyslexia must depend on how the word 'dyslexia' is defined. There is no point in defining dyslexia as 'poor reading'; what is of scientific interest is the syndrome specific to developmental dyslexia, as described by Critchley (1970) and others. Difficulties arise in determining the prevalence of dyslexia in this sense for the following reasons: (i) the condition may show itself differently in different languages; (ii) full assessments on a scale necessary for arriving at a prevalence figure would place a heavy demand on resources; (iii) the situation is further complicated by the fact that there are dyslexia variants -- mild cases sometimes occurring among the relatives of those more severely affected. Research based on 8947 10-year-olds in the 10-year follow-up to the 1970 British Births Cohort Study suggested a figure of 3% for the severe cases, with a further 6% if all the variants and marginal cases are included. The limitations of these figures should be emphasised.

**Keywords:** developmental dyslexia, prevalence, problems

## **Introduction**

It is clear as a point of logic that there are links between figures for the prevalence of dyslexia and its definition: no prevalence figure is meaningful unless there is a specification of the criteria used for determining its presence or absence.

An important function of definitions is to classify, and it is usually the case that for a specified purpose one classification is better than another. There is no point in providing a definition of dyslexia unless it is a definition which draws useful boundaries - either in the place where others (or dictionaries) have drawn them ('lexical' definition) or in a place which marks an important or useful distinction ('stipulative' definition) .

In the case of dyslexia it would be possible in principle to present a record, dictionary-like, of ways in which the word has been used, but from the scientific point of view this would be of limited value given the multiplicity of ways in which, rightly or wrongly, the word has been used.

The interesting challenge is to consider where boundaries can most usefully be drawn, or, if you prefer, where to 'lump' and where to 'split'. What is needed is a grouping of the phenomena which provides a worthwhile taxonomy or classificatory principle. No such taxonomy is provided if we simply group together all poor readers, since poor reading may arise from many different causes. A scientifically valuable grouping, however, can be achieved if we follow Critchley (1970) in treating as a separate group those who display the syndrome, specific developmental dyslexia. The phenomena which make up this syndrome have been described by many writers (for instance Critchley, 1970; Naidoo, 1972; Thomson, 1991; Miles, 1993).

What, then, are the problems in determining the prevalence of specific developmental dyslexia in Critchley's sense? It seems to us that they are threefold.

**(i) In the first place, there are the problems which arise from the fact that dyslexia may manifest itself differently in different languages.**

Our starting point here must be the fact that the different languages of the world have different writing systems. Many, but not all, use an alphabetic script, but there are exceptions, for instance the kanji used in writing Chinese and Japanese words. Even in the case of those languages which use an alphabetic script there are all degrees of phonic regularity: there are some languages - Spanish, Italian and Welsh, for instance - where the same alphabetic letter consistently represents the same sound. This is not true, however, of English and French. Given that dyslexia is primarily a problem of memorising and reproducing symbolic material when it is presented at speed, achieving correct spelling in English presents the learner with exceptional difficulty.

In phonetically regular languages reading as such, even to the typical dyslexic, is unlikely to be too serious a problem. Memorisation of letter-sound correspondences may take a little longer for the dyslexic, but their great advantage is their consistency, and any skill in regular use is unlikely to be forgotten. Problems, however, can be expected to occur, not in reading as such, but in speed of reading and in the memorisation of writing conventions such as diacritical marks.

We do not know at present whether the biological anomalies which occur in dyslexics are common to all countries of the world or whether the distribution of these anomalies varies from one country to another. It seems likely, however, that the former is the case and

that variations in the form taken by dyslexia in different parts of the world depend on environmental factors and in particular on what writing system is used.

In what follows we shall limit ourselves to issues relating to the prevalence of dyslexia among those whose first language is English.

**(ii) A central problem is that of finding the resources to carry out dyslexia assessments on a large scale.**

We illustrate this problem by referring to the 1980 follow-up of the 1970 British Births Cohort Study, in which we ourselves were involved (see, for instance, Miles, Haslum and Wheeler, 1998). We can therefore describe at first hand some of the difficulties which needed to be overcome. The children selected for study were all those born in England, Wales and Scotland during the week April 5th-11th 1970. There were originally over 14,000 such children, and at the time of the follow-up in 1980 educational data were available on 12,905 children. Conventional tests of reading, spelling and intelligence were used, along with four test items which we believed in the context of severe underachievement at reading or spelling could be indicators of dyslexia. (What counts as an indicator of dyslexia often depends on the context in which it occurs). These were the Recall of Digits item from the British Ability Scales (Elliott, Murray and Pearson, 1979, 1982) and three items from the Bangor Dyslexia Test (Miles, 1982, 1997), viz.: a series of questions testing awareness of 'left' and 'right', and a request to recite the months of the year, first in forwards order and then in reverse order. If a child showed dyslexic tendencies on at least two out of these four items and was also a severe underachiever at reading or spelling, he or she was adjudged to be dyslexic. Of the 12,905 children in the study, 3,200 came out as being of low ability on the intelligence tests; and while it is of course quite possible for a child of low ability also to be dyslexic, we decided (after much hesitation) to exclude these children from our analysis on the grounds that 'low ability' is an extra complicating factor. A further 757 children had also to be excluded from the analysis because of incomplete data. In all, therefore, there were data in respect of 8,947 children.

In a recent analysis of our data (Miles, Wheeler and Haslum 2003) we divided the cohort into nine groups by creating three sub-groups of achievement (normal achievers; moderate underachievers and severe underachievers), and three sub-groups categorised according

to the extent to which indicators of dyslexia were present (few or no indicators, a small number and a larger number). The numbers in each group are set out in table 1.

**Table 1. Numbers in each of the nine groups**

Normal Achievers	Moderate Under-achievers	Severe Under-achievers
I. 4998	II. 1159	III. 417
IV. 918	V. 326	VI. 221
VII. 422	VIII. 221	IX. 269

**Groups I, II, and III showed no or few indicators of dyslexia, groups IV, V, and VI a small number of dyslexic indicators, and groups VII, VIII and IX a larger number.**

It will be seen that group IX comprised those severe underachievers who were showing a large number of dyslexic indicators. There were in fact 269 such children, and if all these children and no others were adjudged to be dyslexic, this would result in a prevalence figure of 3%.

What, then, were the difficulties which make this figure of 3% less than satisfactory? A central problem lay in determining who was and who was not dyslexic. In assessing for dyslexia most psychologists give a wide range of tests taking two or more hours. The resources needed for testing over 12,000 children with this degree of thoroughness beggar description, and we had to compromise (see above) by providing just four items which we believed to be relevant to dyslexia - items which could be administered by the children's teachers and which would not take an inordinate amount of time.

What was particularly difficult for us was to have any degree of confidence that dyslexia had been excluded. Thus, as can be seen from table 1, there were 417 children in group III and 221 children in group VI. In the case of neither group was there any way of telling which of the apparent 'positive' signs were genuine indicators of dyslexia and which occurred simply in the course of normal variation. In addition there could have been children in group VIII - moderate but not severe underachievers - who were in fact dyslexic but who by the age of 10 had learned to read and spell not too badly. Although, therefore, one can have some degree of confidence that all or most of the children in group IX were genuinely dyslexic, there may also have been dyslexic children in some of the other groups - there is no way of being sure that dyslexia can be excluded.

In the papers which we have published to date we have claimed only that group III contained a lower proportion of dyslexics than group VI and an even lower proportion than group IX (and similarly, *mutatis mutandis*, with groups IV, V, VII and VIII); we have not attempted to say which individuals were or were not dyslexic. The 'dyslexia' items have proved their worth in that they have led to predictions which could not have been made without them. If, however, one uses these items in an attempt to measure prevalence it is important to be aware of all the reservations which need to be made.

**(iii) There remains a third and even more intractable difficulty with these figures - that arising from the existence of dyslexia variants.**

To the best of our knowledge this is a problem which has not so far been adequately faced. Critchley and Critchley (1978, chapter 9) have spoken of dyslexia variants, or *formes frustes*. In these cases the manifestations can be regarded as incomplete: there may be minor dyslexic signs (sometimes among the relatives of those more severely affected) but the individuals concerned are not classic cases.

On the basis of the data in table 1 we have claimed that such cases can be found in group VII - those children who on our scoring system came out as normal achievers but showed a significant number of positive indicators on the 'dyslexia' items.

We found that this group contained an excess of males and that their mean scores on a number of measures associated with dyslexia (including reading comprehension, pseudoword reading and a mathematics test) were lower than those of the normal achievers in group I.

We call this problem 'intractable' because there is not only a factual issue relating to what would have happened had more data been available, but a conceptual issue as to what combinations of responses should or not count as manifestations of dyslexia. There are, after all, many different ways in which a person can manifest that they are dyslexic; the list of such ways is open-ended. To borrow some words which were used by Wittgenstein (1952) in a different context, 'We do not know the boundaries because none have been drawn'.

In the absence of more detail about the children and in the absence of adequate conceptual specification, any conclusions as to who might be dyslexic in groups III, VI, VII and VIII (to say nothing of the other groups) cannot as a matter of logic rest on sure foundations. However, while acknowledging the weakness of these foundations we have permitted our-

selves the luxury of some speculation. Such speculation might lead us to guess that one third of those in group III, say, 140, one half of those in group VI, say 110, , one third of those in group VII, say 140, and one half of those in group VIII, say 110, could be counted either as being dyslexic or as showing dyslexia variants. This would give another 500 cases or a little under 6%.

The best estimate which we can make, therefore, for the prevalence of dyslexia in Great Britain is 3% of severe cases and a further 6% of mild cases or dyslexia variants. However, there are many uncertainties.

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