



Dyscalculia

A proportion of children beginning school will have been born with deficits that could impact on their ability to deal with all or part of the national curriculum/numeracy strategy. It is believed that 4% of children are severely dyslexic and a further 6% are affected at the mild-moderate level in literacy. It is also believed that about 40% of these will experience significant difficulty with maths.

We are therefore concerned with a large number of the population who have considerable difficulties with the processing of mathematics to a level which may well affect life skills as well as academic achievement.

While dyslexia is now widely recognised in the area of literacy, in the area of numeracy it is most definitely not.

Furthermore there appears to be a second congenital condition that has not even been discussed. This is dyscalculia: its effects on the learning of numerical skills can be very profound. The current best estimates (from England and elsewhere) indicates a prevalence of between 3% and 6% of the population. These estimates are derived from the proportion of children who have specific difficulty with maths despite good performance in other curriculum areas.

Of course, there are many reasons for being bad at maths, but few studies have attempted to separate out the differing needs of these two groups from other causes of underachievement. There will be other children with special needs, such as those with specific language impairment, who may encounter difficulty with the verbal content of the numeracy, but who would not show up in studies, which are based on discrepancies between maths and other abilities.

The DfES defines dyscalculia in terms of "A condition that affects the ability to acquire arithmetical skills. Dyscalculic learners may have difficulty understanding simple number concepts, lack an intuitive grasp of numbers, and have problems learning number facts and procedures. Even if they produce a correct answer or use a correct method, they may do so mechanically and without confidence." (DfES, "EN-US" Guidance to support pupils with dyslexia and dyscalculia,

Preliminary evidence suggests that there may be a specific dyscalculia genotype - that is, a genetic anomaly that may result in a specific deficit in the learning of numerical skills.

Research at UCL suggests that dyscalculic children are troubled by even the simplest numerical tasks: selecting the larger of two numbers, counting the number of objects in a display, and activating the meanings of numerals.

These findings are the basis of a new test for diagnosing dyscalculia that depends very little on the educational experiences of the child, apart from learning the number terms to ten, and very little on other cognitive skills such as reading, language or short-term memory. It makes it possible to assess the child's numerical potentiality independently of their abilities and opportunities in other competencies. A critical feature of the test is the time it takes the child to answer each question in comparison with the average for the age-group, even children of four or five will get most of the questions right. This has the advantage of making the same test usable for all age groups. The test battery using this approach for screening for dyscalculia is available now. More information is available on their website

Web: www.nfer-nelson.co.uk

A recent report from the Basic Skills Agency found that poor numeracy is more of a handicap in gaining and retaining a job than poor literacy. In its most severe forms, children cannot learn to tell the time, know the date, shop competently, nor do even very simple arithmetic. We have anecdotal evidence of a link between failure at mathematics, frustration and deviant behaviour for some of these children. Recently we were told by an inmate at Pentonville Prison that he was so embarrassed by the inability to calculate his money that it had been "easier to nick it than to ruin his street cred" by admitting his weakness. He went on to say that no-one had ever tried to teach him in a way that he could learn, but had always yelled at him for his inability to do the simplest things.

Guidelines.

Recognising dyscalculic problems.

Numbers and the number system: dyscalculic children seem to have an impaired sense of number size. This may affect tasks involving estimating numbers in a collection and comparing numbers.

Dyscalculic children can usually learn the sequence of counting words, but may have difficulty navigating back and forth, especially in twos, threes or more.

They may also find it especially difficult to translate between number words, where powers of ten are expressed by new names (ten, hundred, thousand) and numerals (where powers of ten are expressed by the same numerals but in terms of place value).

Reading and writing numbers may nevertheless be competent, though some Dyscalculic children may find numbers over 1,000 cause problems, even for Year 6 children.

Calculations.

Dyscalculic children find learning and recalling number facts difficult. They often lack confidence even when they produce the correct answer. They also fail to use rules and procedures to build on known facts. For example, they may know that $5+3=8$, but not realise that, therefore, $3+5=8$ or that $5+4=9$.

Lack of an intuitive grasp of number magnitudes makes checking calculations especially difficult.

Solving problems.

Dyscalculic children often don't understand which type of arithmetical operation is asked for.

Measures.

They may have trouble, even with money. There may be exaggerated difficulties with intensive numbers - i.e. those involving x per y , either explicitly or implicitly - such as speed (miles per hour), temperature (energy per unit of mass), averages and proportional measures. Some will have spatial problems, which affects understanding of position and direction.

Handling data.

This will be handicapped by all of the above problems.

Classroom management.

Being unable to do what their classmates can do with ease, can lead to anxiety and, from there to avoidance. Avoidance of number work will, of course, make things worse, and the children will fall farther and farther behind. Dyscalculic children may be particularly vulnerable where teachers follow an interactive whole class method of teaching, recommended in the National Numeracy Strategy.

Pupils are expected to play an active part by answering questions, contributing points to discussions, and explaining/demonstrating their methods to the class. Asking dyscalculic children to answer maths question in public, so difficult for them, but easy for the rest of the class, will inevitably lead to embarrassment and frustration.

Dyscalculia is a special need, and children will require diagnosis and appropriate counselling, as well as support away from whole class teaching.

Support.

Compared with dyslexia, very little research has focussed on the problems of dyscalculic children's difficulties and how to overcome them. We are not sure whether there is just one form of dyscalculia or several, and therefore whether different approaches may be needed. It is likely that dyscalculic children will need one-to-one teaching to support what they learn in the classroom. A useful approach to helping children with dyscalculia has been published this year by Kay and Yeo.

Further reading.

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