

DYSCALCULIA

Pocketbook

Tips, tools and techniques
for supporting children whose
mathematical ability is
affected by dyscalculia



Judy Hornigold

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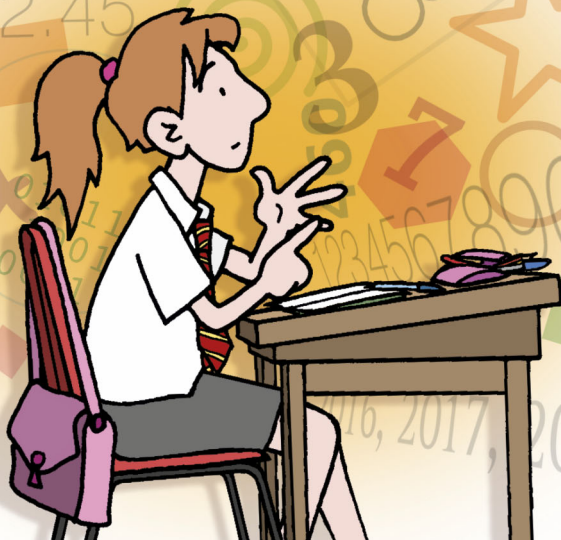
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Pocketbook

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Foreword

It's only in recent years that the term 'dyscalculia' has become more commonly known. Perceptions as to what it is remain wide-ranging, from '*dyslexia for numbers*' to '*being really bad at maths*'. I hope this book will go some way to explaining what dyscalculia actually is and that it will help both teaching professionals and parents understand how to support children with this specific learning difficulty.

Research into dyscalculia is very much in its infancy. We are in a similar position now to where we were with dyslexia in the late 1990s, when people questioned its very existence. My experience of working with children and adults has left me in no doubt that dyscalculia exists and can be a debilitating condition.

Having dyscalculia can lead to social isolation as a result of an inability to be at the right place at the right time or to understand the rules and scoring systems of games and sports. Some dyscalculic adults never learn to drive because of the numerical demands of driving and map reading (though the advent of Sat Navs has been a real asset). Personal finances and budgeting are often difficult for people with dyscalculia, and research shows that adults with low numeracy earn significantly less than adults with average or high numeracy.

Foreword

In *Damn the three times table*, an article written for Loughborough University's Maths Education Centre, Jess Blackburn talks of her struggle with dyscalculia and how, as an adult, she still can't tell the time on a 24 hour clock. She finds travel difficult and frequently boards the wrong train at the wrong time, which, as she says, can make for some interesting journeys! On a more serious note, she has lost jobs because of her inability to deal with money and figures. Dyscalculia is a lifelong problem, the effects of which should not be underestimated.

Having said all that, while being dyscalculic can be a very frustrating experience, it doesn't mean that you will never achieve anything. Henry Winkler, Cher and Mick Hucknall have dyscalculia, as had Albert Einstein and Thomas Edison. A surprising number of mathematics professors are dyscalculic, reminding us that this is a specific difficulty with number, not with every branch of mathematics. It is also a difficulty that can be alleviated with well-targeted support and intervention.

Paul Moorcraft's book, *It Just Doesn't Add Up* is testament to what can be achieved despite severe dyscalculia.

Foreword

'Mathematics has beauty and romance. It's not a boring place to be, the mathematical world. It's an extraordinary place; it's worth spending time there.'

Marcus du Sautoy (Professor of Mathematics, Oxford University)

Maths has given me a great deal of pleasure in my life and it continues to fascinate and surprise me. I feel passionately that all children, regardless of whether or not they have dyscalculia, have the capacity to be competent mathematicians and, ultimately, to enjoy maths. In writing this book, my aim is to enable teachers to help learners with dyscalculia to overcome their difficulties and to enjoy, rather than endure, the time they spend in this beautiful mathematical world.

Dyscalculia is often first spotted in primary school, so the strategies outlined in this book do have a primary bias. However, those whose dyscalculia is not identified until secondary school, or indeed beyond, invariably need to go back to the basics, as it is often early and fundamental concepts that they are lacking. Older learners with dyscalculia need concrete materials to help them 'see' the maths. Resources such as base ten materials and Cuisenaire rods are useful across the age range.

A glossary at the end of the book covers mathematical terms referred to in the text.



What is Dyscalculia?



Identification



Dyscalculia and Maths Anxiety



Teaching Strategies



Top Ten Tips



Games and Next Steps



Further Information



What is Dyscalculia?

Explaining dyscalculia



Dyscalculia is a specific learning difficulty affecting a person's mathematical ability. In terms of research and understanding of the condition, experts such as Brian Butterworth (emeritus professor of cognitive neuropsychology, UCL) and consultant, researcher and writer Steve Chinn are at the forefront of current research, but dyscalculia remains the baby of the specific learning difficulties family. There's a wealth of information about dyslexia, dyspraxia and autism, but not nearly as much is known or understood about dyscalculia.

You may hear people describe it as: *'Difficulty with numbers'* *'Being bad at Maths'* *'Number Blindness'* or *'Dyslexia for Maths'*.

Dyscalculia is certainly a difficulty with number but it is a much deeper-rooted problem than just being bad at maths. The descriptions 'number blindness' and 'dyslexia for maths' are somewhat misleading and not really a true reflection of this condition.

Coined in the mid-20th century, the word dyscalculia has both Greek and Latin origins: the Greek prefix 'dys' means 'badly', while 'calculia', from the Latin 'calcularé', means to count. Literally, dyscalculia means to count badly; the reality is much more complex.

Common difficulties



People with dyscalculia may struggle with any or all of the following areas:

- **Estimation** – being able to tell if an answer is reasonable or not.
- **Short- and long-term memory** – difficulty remembering procedures in maths
- **Time** – many children have difficulty in learning to tell the time, but this can persist in learners with dyscalculia. They can also have difficulty with appreciating the passage of time. So they may not be able to tell whether one minute or one hour has passed
- **Assessing numerical quantity** – eg when given two numbers a dyscalculic learner will struggle to identify which is numerically larger
- **Money** – this can be a severe difficulty and often stems from a lack of understanding of place value, eg not being able to appreciate that a £20 note will be sufficient to cover a £15.75 taxi fare
- **Performing calculations** – both in choosing the correct numerical operation and applying it correctly
- **Sequencing and recognising patterns**
- **Counting backwards and counting in steps**
- **Direction/ orientation** – difficulty in understanding spatial orientation, confusion over left and right, leading to difficulties in map-reading and following directions

Definitions



As with dyslexia, there is no single commonly accepted definition of dyscalculia. The Department for Education (DfE) describes it as:

'... a condition that affects the ability to acquire arithmetical skills. Dyscalculic learners may have a 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.'

A more quantifiable definition, perhaps, is given by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM IV) which sees dyscalculia as a mathematics disorder:

*'As measured by a standardised test that is given individually, the patient's **mathematical ability is substantially less than you would expect** considering age, intelligence and education. This deficiency materially impedes academic achievement or daily living.'*