

Dyscalculia: Burdened by blunders with numbers

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Between 3 and 6% of schoolchildren suffer from an arithmetic-related learning disability. Researchers at Ludwig-Maximilians-Universitaet (LMU) in Munich now show that these children are also more likely to exhibit deficits in reading and spelling than had been previously suspected.

Addition and subtraction, multiplication and division are the four basic operations in arithmetic. But for some children, learning these fundamental skills is particularly challenging. Studies show that they have problems grasping the concepts of number, magnitude, and quantity, and that they do poorly when asked to estimate relative amounts. In mathematics classes they consistently lag behind, although they have little difficulty in subjects. In other words, they suffer from a highly specific learning disorder, which psychologists call 'dyscalculia'. In total, about 5% of second- to fourth-graders manifest the condition. Depending on which arithmetical operation is tested, the prevalence of the disorder varies between 3 and 6%. These figures emerge from a new study carried out by LMU researchers led by Professor Gerd Schulte-Körne, Director of the Department of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy, which has just been published. The data are based on tests carried out on 1633 third- and fourth-graders in schools in the Munich area.

An arithmetic-related deficit can have a drastic effect on overall scholastic achievement and on the psychological development of the children affected. They are reluctant to go to school because they are



afraid of being perceived as failures and embarrassing themselves in front of their classmates. Wherever possible, they resort to the use of avoidance strategies and develop a negative self-image. In the end, their performance also suffers in subjects in which they are perfectly capable. Their lack of mathematical skills usually precludes them from going on to the type of secondary school for which their level of intelligence would otherwise qualify them, and impedes their chances of higher education. Indeed, so long as they continue to get bad marks in mathematics, their chances of even completing secondary school remain low.

A promising training model

Schulte-Körne complains that the problems of children who suffer from dyscalculia are often overlooked in everyday classroom routine. Furthermore, unlike the situation in the case of dyslexic disorders, there is no provision in Bavarian schools for adapting the learning environment so as to alleviate the burden on these children, he adds. "This is not an appropriate response to a disorder that has a biological basis," he says. It would, for example, be perfectly possible to give such children more time to complete their classwork in mathematics, to give them extra help, and even to refrain altogether from assigning a formal mark to their performance in the subject.

The new study, however, also shows that developmental deficits in cognition can affect more than one learning domain. The LMU researchers found the prevalence of so-called comorbidity to be far higher than has been previously recognized. According to psychologist Dr. Kristina Moll, first author on the new report, about 57% of children who have an arithmetic-related learning disorder also suffer from a reading or spelling disability. "These data were quite a surprise for us", Schulte-Körne confesses. "This finding forces us to think again about diagnostic procedures for specific learning disorders but, above all,



about how we can more effectively treat these conditions," Moll adds. "These children need intensive and specific training and support. Otherwise, they are in danger of failing to achieve the scholastic success that would be compatible with their general level of intelligence." As Schulte-Körne points out, effective approaches to the mitigation of dyscalculia are already available. These, however, require intensive, longterm training programs for the <u>children</u> affected.

In addition, the new study reveals that gender also appears to play a role in determining susceptibility to specific learning disorders, says Schulte-Körne: While deficits in spelling are more prevalent among boys, girls are more likely to display <u>dyscalculia</u>. Reading difficulties, on the other hand, appear to be equally prevalent in both sexes. The reasons for these striking findings remain unclear. Schulte-Körne suspects that biological factors are responsible, given that the learning environments experienced by both sexes are very similar.

Provided by Ludwig Maximilian University of Munich

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