

Researchers explore links between learning disorders in children

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New interdisciplinary research from Western University has uncovered fundamental links among three major learning difficulties in some school-age children. Although many children have specific problems with dyslexia, specific language impairment and dyscalculia, this study is the first to show a significant portion of these children have overlapping deficits. Importantly, the research team has also devised a 10-minute screening test that could be administered broadly in primary schools to identify children at risk for the different disorders.

The collaborative project includes findings from four researchers at Western's Brain and Mind Institute (BMI) and the Faculty of Health Sciences that independently specialize in the three key developmental disorders.

Dyslexia is a deficit in the development of reading while specific language impairment is a disorder related to poor development of [spoken language](#) skills. Dyscalculia is a severe difficulty in making mathematical calculations.

Past research in these disorders has focused on each of these as single impairments, despite the widespread recognition that they commonly overlap. For a study published in the journal *PLOS ONE*, Lisa Archibald and Janis Oram Cardy from the Faculty of Health Sciences' School of Communication Sciences and Disorders and Marc Joanisse and Daniel Ansari from BMI collaborated across disciplines and examined – for the first time ever – the co-occurrence of difficulties in reading, spoken

language, and [mathematical calculations](#) in a large sample of school-age children.

In the study, researchers tested learning profiles of a large sample of school children aged 4 to 10-years old in the region of London, Ontario. The research team found that although some of the children showed specific deficits in reading, spoken language, or math, a significant number of children exhibited a mixed profile of a reading plus a math deficit, or an even wider-ranging weakness spanning math, reading, and spoken language.

"This is the first time researchers have looked at possible [learning difficulties](#) in different areas in a large sample of the same kids," says Archibald, the *PLOS One* paper's lead author. "It's an important first step in trying to understand the large variability that is commonly reported for groups with learning disabilities."

The study has also uncovered some essential hints as to why different learning patterns might occur in different children. For instance, children who showed weaknesses on all three types of abilities also scored very low on a working memory assessment. (Working memory is the ability to hold multiple pieces of information in mind and perform simple operations on them, such as repeating a sequence of digits in the reverse order in which they were presented). According to the findings, such children may require a more targeted approach to remediation, due to the complex nature of their difficulties. Children who have more specific deficits did not show the same difficulty with [working memory](#) and would require quite different interventions.

"Educators face significant challenges in identifying learning problems in children. With additional testing, we hope that a new tool that we have developed will someday provide educators with a quick and effective method for identifying which [children](#) need extra help, but also a way to

develop more individualized remediation programs," says Joannis.

More information: Original Article: Archibald LMD, Oram Cardy J, Joannis MF, Ansari D (2013) Language, Reading, and Math Learning Profiles in an Epidemiological Sample of School Age Children. *PLoS ONE* 8(10): e77463. [DOI: 10.1371/journal.pone.0077463](https://doi.org/10.1371/journal.pone.0077463)

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