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New method of scoring IQ tests benefits children with intellectual disabilities

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Parents of children with intellectual disabilities have long been frustrated by intelligence quotient (IQ) testing that tells them little to nothing about the long-term learning potential of their children.

That's because these tests are scored according to the mean performance of children without disabilities. The result is that the raw scores of many children with intellectual disabilities are converted into the lowest normalized score, typically a zero.

"We send back these reports that don't tell parents anything about their child," explained David Hessl, an associate professor of clinical psychiatry and a researcher at the UC Davis M.I.N.D. Institute.

Hessl and a team of collaborators have devised a new system of scoring IQ tests taken by children with fragile X syndrome, a genetic disorder that causes intellectual disabilities, including autism. The details of the new method are described in a study published online today by the *Journal of Neurodevelopmental Disorders*.

"If this new method becomes widely available, we will be able to tell parents something more useful and more accurately diagnose and treat young children who are learning disabled," said Hessl, a physician who cares for children at the M.I.N.D. Institute with fragile X syndrome.

According to Hessl, there is a lot of meaningful variability in the performance of these children on IQ tests.

"We believe that this variability is important information about the relative strengths and weaknesses that these children have," Hessl explained. Frustrated by the lack of sensitivity of IQ tests, Hessl set out to devise a scoring method that would reveal the strengths and weaknesses of each child.

"I knew a more accurate estimation of the potential of these children would make a big difference in their lives," he said.

Hessl worked with fragile X researchers at the M.I.N.D. Institute and Stanford University, as well as a statistician from Pennsylvania State University. The team came up with new normalized scores for 217 children with fragile X syndrome who had undergone IQ testing.

Many of these children had normalized scores of 0 on the Wechsler Intelligence Scale for Children, an intelligence test for children between the ages of 6 and 16 that can be completed without reading or writing.

On the new scale, children scored as low as minus 10 on 14 subtests. These included verbal, arithmetic, picture completion and object assembly.

Like normalized scores of children without disabilities, the frequency of the new normalized scores for children with fragile X syndrome followed an expected, bell-shaped distribution.

"These new scores tell us more precisely how a child with fragile x syndrome deviates from the normal population in every sub-test area," Hessl said.

Physicians and parents also need to know that these new scores reflect something about the biology of the children.

So, the research team went on to compare the new normalized scores to a measure of adaptive behavior and a biological measure of the severity of fragile X syndrome. Without a normal copy of the fragile X gene, a vital protein (FMR1 protein, or FMRP) is not made and the result is the onset of characteristic mental disorders, which can range from learning disabilities to severe cognitive or intellectual disabilities, such as autism.

Hessl and his colleagues compared the levels of FMRP in blood from the test subjects to their new scores and found a significant correlation. They found similarly significant correlations between the IQ test scores and scores on the Vineland Adaptive Behavior Composite, which measures personal and social skills used in everyday living.

Treatment of fragile X syndrome depends on its manifestations in the individual, and range from behavioral therapy to medication. Widespread use of new normalized scores would allow physicians to better treat their patients, Hessl said.

Psychological Corporation, the publishers of the Wexler IQ test, gave permission for their raw date to be used in the context of research.

"I think we've made a good case for the makers of this test and others to release raw data to researchers so that this method can be applied to other populations with intellectual disabilities," Hessl said.

He is also hopeful that someday soon he will get permission to use his new scoring method when treating his patients. In the future, the publishers of IQ tests should include lower-functioning individuals in their standardization studies, Hessl said.

"This might mean over-sampling those with intellectual disability in order to get more sensitivity, but it would help so many children," he said.

Source: University of California - Davis