

Pediatric Neuropsychology: Part II

By Norman J. Cohen, Ph.D.

Here is Part II of Dr. Norman J. Cohen's article on "Understanding Neuropsychology," reprinted from Meeting Ground, the newsletter of the Courage Center, Minneapolis, Minnesota.

IN MY previous articles, I wrote about what a neuropsychologist does. In order to better understand neuropsychological testing, it may help to review and define some of the terms used when we talk about a child's thinking skills.

Mental Retardation

A child is diagnosed as mentally retarded when his or her ability to do certain tasks is significantly below what would be expected of a child the same age. For example, if 100 children were given a test of intelligence and one child had one of the two lowest scores on this test, one might say that the child was retarded. In fact, it is only the bottom 2 percent of children who fall in this range. However, it is also possible to have other more limited abilities that "fall" in the retarded range.

Some children who have brain injuries do well on tasks that involve words, like reading, while doing much more poorly on the other kinds of tasks that involve visual information, such as mathematics, mazes, etc. These children are *not* retarded, but have certain skills that fall in the retarded range. This range is often given other names such as "handicapped" or "impaired."

Learning Disability

There are many definitions of exactly what a "learning disability" is, and in fact the legal definition varies from state to state. It may be useful to think of a learning disability as a deficit in one specific area of thinking as shown by

poor performance in one particular area of schoolwork. For example, a child may do quite well at reading and mathematics but quite poorly in writing or spelling. This may have to do with the way the child's brain puts letters together in order, with visual-motor skills, etc. The determining factor in defining this and other similar problems as learning disabilities is that the child has one specific skill or group of skills at a much lower level than the rest of his skills. A child with a learning disability may actually have outstanding abilities, well above average, in other areas of strength. A classic example of this is Albert Einstein, who, in the days before the calculator, had to hire someone to help him do simple mathematics, such as division, because he had so much trouble doing this work.

Memory

Most neuropsychologists think of memory differently than most parents do. For a neuropsychologist, memory is separated into two parts. The first part is "short-term memory," which involves what a child can remember almost immediately after hearing or seeing something. For example, I might read a story to a child and then ask the child to repeat it back to me right away. This is short-term memory.

The other area of memory is "long-term memory." If I asked the child to repeat a story to me 30 or 60 minutes after I first read it to him, that is long-term memory. Therefore, long-term memory includes everything from events that happened several hours ago to things that happened years ago. Most importantly in the school setting, virtually all academic tests involve long-term memory, even if a child is being tested on something that was taught only several hours before.

Attention

Attention is the ability to focus on something immediately at hand and to maintain that focus over a limited time. In school, attention may be a problem for children when listening to a teacher's lecture. Such children often "go in and out," listening to and hearing what the teacher says for a few seconds, then missing a few seconds, etc. For such children, trying to understand what the teacher is saying is often as difficult as reading a book with every third word taken out, even though the child may be trying hard. Children with attentional problems may be very bright but this may not be reflected in their school performance because of attentional problems.

Attention Deficit Disorder (ADD)

ADD is the name given to describe children with such deficits in attention. Various new tests have come out to assess this disorder, many of which are done on computers. In addition, there are many rating scales that are given to parents and teachers that attempt to figure out if a child has problems with attention. Many studies show that children with attention problems oftentimes are also highly active, leading to a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). However, it now appears that attentional disorders can also exist without accompanying overactivity.

Many children with ADD or ADHA are given medications such as Ritalin or other stimulants, which often improve attention. Initial concerns over the safety of such drugs were somewhat overstated. However, Ritalin does have potential side effects and is not a drug that works for every child. Careful consultation with a physician who is well versed in the use of these medications is essential for any child with attentional problems who is being considered for such treatment.

Achievement

"Ability" is the word used to describe the child's inborn skill at performing thinking-skills tasks. A child with great motor coordination may be said to have the "ability" to be a great athlete. Similarly, a child with outstanding intelligence may be said to have great thinking-skills "ability." "Achievement" in the school setting is based on what the child actually does on tests, papers and so on—i.e., actual performance. Many children with outstanding ability are not outstanding readers, writers, mathematicians, etc. Many factors may influence this, including the child's motivation, the child's emotional state, learning disabilities in a specific area and teaching style.

I.Q.

These two letters stand for Intelligence Quotient, a general number that sums up how a child compares with other children his or her age in his or her ability to do a variety of thinking-skills tests. It is a general summary of how "smart" a person is compared to his peers. There are two main problems with this. First, everyone has strengths and weaknesses. To summarize a person's thinking skills with one number may unfairly ignore specific talents or unwisely smooth over specific deficits in any person. Second, there are several different tests designed to assess I.Q. Unfortunately, each of these tests gives different measurements, making it difficult to figure out what I.Q. actually is.

In reviewing the results of neuropsychological testing, it is important that these terms be clearly explained to the parents and others who are involved in the child's learning program. Once the terms are understood, realistic expectations and strategies can be established to help the child maximize his or her thinking skills and be more successful in this learning.

Shunt Design Trials: A Report

By Marvin Sussman, Ph.D.

AT THE XXVIIth Annual Congress of the International Society for Pediatric Neurosurgery (ISPN), held in Salt Lake City, Utah, in late September, over 200 pediatric neurosurgeons came together from around the world. The Congress featured a number of presentations about hydrocephalus—two of which dealt with large multicenter evaluations of new hydrocephalus shunt designs.

Dr. John Kestle reported on the "Long-Term Follow-up from the Shunt Design Trial." This multicenter (12 North American and European) trial was initiated in 1993 to assess whether two new shunt valve designs (Delta Valve and Orbis Sigma Valve) would reduce shunt failure rates. The study included 344 patients who were randomized to differential pressure (DP) shunts (at physician's option, Delta Valve or OSV); DP valves were used for the control group. Dr. Kestle indicated that the study, which initially had not been designed for long-term follow-up, did not show a significant difference in the time of first shunt failure among the three valve designs. The original analysis, which has been published previously, was based upon the patients' status as of October 31, 1996—these patients accrued two years of data and had a minimum of one-year follow-up per patient.

Since one criticism of this study was that the follow-up was too short to assess long-term shunt function, the group wanted to report long-term results. This analysis is based upon the most recent follow-up for patients with a minimum of three years' follow-up.

Infants and children aged 0 to 18 years undergoing an initial shunt were randomized. Patients were followed until their first shunt failure, which was

defined as the appearance of obstruction, overdrainage, loculated compartments or infection. If the shunt did not fail, follow-up continued until the present time, since patients did not reach the criteria for an endpoint (i.e., shunt failure). The initial review was based upon analysis of data from October 1993 to October 1995, with blinded adjudication committee's decision about shunt failure. The study results were the same when the trial was reanalyzed using re-operation as an endpoint, so no repeat blinded adjudication was used for the analysis process. There has been no difference between the surgeon's assessment and the adjudication committee's analysis. Long-term data collection was complete at 9 of 12 centers.

To date, 167 patients have met the endpoint: shunt obstruction in 108, overdrainage in 13, loculated ventricles in 2 and infection in 28. Overall shunt (device) survival for the three shunt types was: one year (62 percent); two years (52 percent); three years (46 percent); four years (41 percent). Infection rate was 8.4 percent.

Endpoint	Delta	DP	OSV
Obstruction	47	45	39
Overdrainage	10	2	0
Loculations	0	0	2
Infection	9	8	12

A shunt survival curve for the group and for the individual valves was shown. There was a steep fall-off in all shunts after initial implant during the acute postoperative period. When data on the three valve groups was presented by valve type, the highest survivals were associated with the OSV, followed by DP valves and then the Delta Valve. Dr. Kestle stated that no shunt clearly had the longest survival, and that successful shunting was center-related.

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