

Children with NVLD may develop a great deal of skill in talking their way out of challenging tasks or facing novel situations that provoke anxiety. Their rote verbal capacities and rote verbal memory skills may be a personal strength but they show poor language pragmatics or the functional use of language.

Nonverbal tasks may be quite difficult for children with NVLD. On tasks that require fine motor coordination these children often show early delay. Early paper/pencil tasks can be extremely frustrating for them and later handwriting may show poor quality. On formal tasks of cognitive functioning they do much better on verbal tasks compared to nonverbal tasks. Tasks that require interpreting or pulling together visual information can be hard, especially if it is not possible to explain the task verbally with step-by-step instruction. Additionally, verbal tasks that entail more complex problem solving or the integration of information from various sources are quite hard for children with NVLD. Children struggle with common academic tasks such as answering questions at the end of a chapter or performing on tests where the questions are worded differently from the study material.

Humor or sarcasm can be hard for children with NVLD to appreciate. **They often cannot understand jokes, or they interpret them in such a CONCRETE way that the humor is lost.** Sarcasm, expressed by the mismatch between a spoken message and the facial expression or tone of voice, requires integration of information from different sensory modalities. Children with NVLD may interpret the message quite literally, missing altogether the information needed to recognize that it is sarcasm.

SOCIAL OR ADAPTIVE CHARACTERISTICS

Novel situation can be particularly troublesome as they require generating responses that cannot be anticipated or practiced beforehand. **Children with NVLD often rely on ROTE or PRACTICED behaviors that may not be appropriate for the context.** For example, if they learn the right way to introduce themselves to an unfamiliar adult (by shaking hands and saying, "pleased to meet you") they may attempt the same response in a group of children where it might be viewed as odd or 'nerdy'. When peers to give them subtle feedback, such as raised eyebrows, they miss the information completely and cannot therefore modify their behavior next time. Peers may pull away or nonverbally signal the end of a conversation and children with NVLD may pursue the interaction, talking even as the peer turns his back. Children with NVLD wants friends, just like everyone else and they may intensify their efforts to reach out, despite repeated rejection. The recognition that they are being rejected may not come until they are older; their hurt and confusion grows because they are unable to understand the increasingly complex social rules of adolescence.

CAUSE OF NONVERBAL LEARNING DISORDER SYNDROME

Although no cause for this disorder has been definitely identified, it is known that deficits in the functioning of the right hemisphere of the brain play a significant role. The brain is divided into two hemispheres, the right and left, which typically compliment each other in functioning but are suited for different types of processing. The right hemisphere can integrate information from several sensory modalities at once (can interpret visual and spoken information at once, thereby clarifying how a facial expression can change the meaning of a verbal message) and is best for processing novel information. The left hemisphere processes information presented in a step-by-step fashion and is best at using information once it is well practiced or rote. Spoken language is processed by the left hemisphere, visual or nonverbal information is process by the right hemisphere, and the right hemisphere additionally becomes involved in understanding anything novel or contradictory between the verbal and nonverbal messages.

Deficits in the functioning of the right hemisphere, observed in children with NVLD, could emerge through various avenues. If there is any early interruption in the development of the central nervous system, the right hemisphere is more likely to be compromised than the left. Direct damage to the right hemisphere through trauma, tumors and/or seizures can cause compromise in right hemisphere functioning. Sometimes there is no known reason for observed weakness in right hemisphere functioning.

INTERVENTIONS

1. **Children with NVLD do best with instruction that is verbal and descriptive in nature.** Instead of showing them how to perform a math operation, for instance, they should be verbally instructed in a step-by-step manner.
2. **Assess reading comprehension carefully because good oral reading can hide the extent of weak comprehension.** Teach strategies to aide comprehension such as learning to identify the topic sentence and highlighting important information for later study or review. Tell them what specific facts they will need to know for a test rather than asking them to determine, on their own, what important information within a text or lecture they should focus on.
3. **Because language concepts can be weak, children with NVLD need to understand terms such as same versus different, part-to-whole relationships, how to classify or categorize objects and the difference between cause and effect.** In expressive language instruction they should focus on staying on the topic, listening without interrupting, and recognizing when someone has signaled the end of a conversation.
4. **Spatial concepts are difficult so children may need to learn verbal self-instruction for analyzing and reproducing designs.** Certain tasks such as map reading or learning the location of all the capital cities should be avoided altogether. If telling time on a clock fact is very challenging, teach telling time with a digital clock instead.
5. **Written work can be extremely frustrating due to the combination of mechanical problems related to fine motor delays and poor visual spatial skills.** Decrease the quantity of writing expected and instead allow verbal expression of information. Additionally, teach early keyboard skills.
6. **Involve the school counselor or social worker to foster social development at school.** Friendship groups that involve a small number of selected peers are one intervention. Teachers can help identify which classmates would be most responsive to and supportive of your child. Specific and concrete instruction such as teaching the child how and when to initiate peer interactions, how to wait one's turn or the appropriate moment to speak, how to make consistent eye contact and pleasant facial expressions can be very beneficial.
7. **Create a supportive home environment in which your child feels secure and successful.** Minimize demands that highlight your child's weaknesses by being very clear and specific about what you expect. Observe your child carefully in novel or complex situations to gain an appreciation of strengths and weaknesses and set your expectations accordingly.

Remember that watching you do something is not the best way for your child to learn. Instead, instruct them in a step-by-step manner. Also, reminder lists of even basic tasks such as daily hygiene and simple chores is very helpful. It is all right to point out to them what they may not yet have recognized about themselves, i.e., "You do much better when you know what's going to happen than when you get unexpected surprises." Constructive suggestions rather than criticism works best.

And, as you've heard countless times before, you are the best advocate for your child. Collaborate with your child's school about proper interventions and work hard to develop and maintain a positive relationship with school personnel so that you can share what has worked for your child in the past and brainstorm with them about other interventions that might be helpful.

Nonverbal Learning Disorder Syndrome is not a widely recognized diagnosis and school personnel may be genuinely unsure about how best to serve your child. A comprehensive and thorough neuropsychological assessment by an experienced clinician, with regular follow-ups, is critical to insure that appropriate strategies are put in place to assist your child in realizing his or her potential.



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NONVERBAL LEARNING DISORDER

Nonverbal learning disorder syndrome (NLD) is a specific type of learning disorder that has been identified with some children with hydrocephalus. The discovery of the NLD syndrome began in the early 1970s; however, even today many professionals in the field of education are uninformed about NLD and many children with this learning disability go undiagnosed.

What does nonverbal learning disorder look like?

Children with nonverbal learning disorder are often very bright. Young children may even be targeted as gifted due to their mature vocabulary, rote memory skills and apparent reading ability. However, parents may notice early that their children have difficulty with things like interacting with other children, self-help skills or fine and gross motor activities. Parents may suspect that something is amiss early on, but they can't quite put a finger on it. Children with NLD may manage to go along through their early elementary years handling the academic demands fairly well. But as they enter the upper elementary grades or begin middle school, they are left to handle more tasks on their own and things rapidly deteriorate. They get lost, forget to do homework, have difficulty following directions, struggle with math, can't write an essay and are continually misunderstood by both their peers and teachers. They are accused of being lazy, rude or uncooperative. They are not any of these things—they have NLD.

What causes nonverbal learning disorder?

Current evidence and theories suggest that the destruction, disorder or dysfunction of white matter in the right hemisphere of the brain could be the cause of nonverbal learning disorders. Researchers have associated NLD with patients who have neurological histories including:

- Moderate to severe head injury
- Repeated radiation treatments
- Tumors
- Seizures
- Congenital absence of the corpus callosum (the band of neural fibers connecting the two cerebral hemispheres)
- **Hydrocephalus**

Each of these neurological conditions involves destruction of white matter connections in the right hemisphere of the brain. The brain is divided into two hemispheres, the right and left. The right hemisphere can integrate information from several sensory modalities at once (for instance, interpreting visual and spoken information at the same time, thereby clarifying how a facial expression can change the meaning of a verbal message) and is best for processing novel information. The left hemisphere processes information presented in a step-by-step fashion and is best at using information once it is well

practiced or rote. Spoken language is processed by the left hemisphere. Visual or nonverbal information is processed by the right hemisphere, which also becomes involved in understanding anything novel or contradictory between the verbal and nonverbal messages.

Three categories of dysfunction present themselves in children with NLD:

- **Motoric** – A child with nonverbal learning disorders commonly appears awkward and is, in fact, inadequately coordinated in both fine- and gross-motor skills. He or she may have had extreme difficulty learning to ride a bike or kick a soccer ball. Fine-motor skills, such as cutting with scissors or tying shoelaces, seem impossibly for this child to master. A young child with NLD is less likely to explore his or her environment motorically.
- **Visual-Spatial-Organizational** – In the early years, a child may appear confused much of the time, despite a high intelligence and high scores on receptive and expressive language measures. It is difficult for this child to change from one activity to another or to move from one place to another. A child with NLD may use all of his or her concentration and attention to merely get through a room.
- **Social** – A child with NLD may lack the ability to comprehend nonverbal communication. Her or she may misinterpret body language and/or tone of voice. He or she may have trouble perceiving subtle cues in social environment, such as when someone has gone far enough, the idea of “personal space,” facial expressions of others and nonverbal signals that another person is registering pleasure or displeasure.

Common characteristics of nonverbal learning disorders

- **Performance IQ significantly lower than verbal IQ**
- **Early speech and vocabulary development**
- **Remarkable rote memory skills**
- **Attention to detail**
- **Early reading skills development, excellent spelling skills**
- **Expresses him- or herself eloquently**
- **Lack of coordination**
- **Severe balance problems**
- **Difficulties with fine motor skills**
- **Lack of image, poor visual recall**
- **Faulty spatial perceptions**
- **Difficulties with spatial relations**
- **Lack of ability to comprehend nonverbal communication**
- **Difficulties adjusting to transitions and new situations**
- **Significant deficits in social judgment and interaction**

Assessment

The assessment of individuals suspected to have NLD should be conducted by an interdisciplinary team and focused on developing an appropriate intervention plan. There is no single test, cluster of tests or cut-off score on an individual test that will alone signal the presence of NLD. It is important for a child's parents to be involved at all levels of this process. The most crucial consideration when retaining a professional for an evaluation of your child is that he or she be knowledgeable of NLD and know how to distinguish it from other disorders with the same or similar symptoms.

A comprehensive assessment would include the following components:

- A thorough developmental history
- Neuropsychological testing
- A speech and language evaluation
- Educational assessments
- Occupational therapy evaluation

Some of the professionals who might be involved in the diagnostic process include the following:

- A developmental pediatrician
- A pediatric neurologist
- A neuropsychologist
- A speech and language pathologist
- An educational therapist

Nonverbal learning disorders constitute a dysfunction in the basic cerebral processes and as such denote a disability that warrants specialized support and program modifications and accommodations for a student with NLD. All of the identified supports, modifications and accommodations should be addressed in the student's IEP or 504 plan. Teachers and parents should work closely together in planning and accommodating each child's unique needs.

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