



Editor's Comment

Research in the field of learning disabilities has yielded a great deal of information regarding the identification and treatment of language-based disabilities. Nonverbal learning disabilities, however, have been unrecognized and most likely underdiagnosed. In addition to academic problems, children with this disorder are at risk for emotional problems. One of the defining characteristics of a nonverbal learning disability is a deficit in social awareness, although verbal facility can be well developed. As the child matures and social misperceptions and blunders become more pronounced, feelings of isolation, friendlessness and hopelessness may result. Children with nonverbal learning disabilities are at risk for the development of internalizing symptoms such as depression, withdrawal and anxiety. These factors underscore the critical need to identify and treat nonverbal learning disabilities as early as possible to forestall the emergence of mental health problems.

In this issue of the *NYU Child Study Letter*, the authors describe and define nonverbal learning disabilities, differentiate among other diagnoses and outline effective interventions.

HSK

Introduction

There is no typical picture of a child with a learning disability. Learning-disabled children show a range of learning styles and present diverse areas of strengths and weaknesses. The term "learning disability," which originated in the early 1960s, was used to describe children with normal intelligence who were not

Nonverbal Learning Disabilities

achieving adequately in the usual educational settings. Since that time there have been a number of attempts to identify subtypes of learning disabilities for the purpose of establishing appropriate intervention strategies. The subtypes were initially categorized as a deficiency in verbal acquisition or academic achievement. Researchers subsequently began to describe another subset of children who didn't fit into the established categories. Their deficits were neither verbal nor academic in the usual sense; rather they were lacking in social perception. Although they possessed well developed verbal skills, these children were unable to comprehend the significance of many aspects of their environment. They had difficulty interpreting the meaning of others' actions, gestures and facial expressions. In short, these children had trouble "reading between the lines." This constellation of strengths and weaknesses is classified as a Nonverbal Learning Disability.

Case Example

Roger is an eleven-year-old boy with a history of attentional problems for which he receives medication. Presently in sixth grade, he has a long-standing history of academic difficulties. In the earlier grades his teachers felt that something was awry, but just as they would pinpoint some weakness, it would disappear or change. The school psychologist wondered if the diagnosis of Attention-Deficit/Hyperactivity Disorder was correct, and suspected that Roger might have Asperger's Syndrome. He had persistent math problems and the transition from third to fourth grade was quite difficult for him. Although he easily learned to read, he had difficulty

"reading to learn." His dad often helped him with homework organization and with projects. His time management was poor. When Roger began middle school he had marked difficulty with departmental instruction and finding his way in the new physical space. Roger never had many friends, and preferred solitary to group activities.

Roger's parents became more confused the more they researched and read. Roger's traits, characteristics and skills seemed to fit with a number of different diagnoses. They requested an interdisciplinary team evaluation, including neuropsychological, academic and psychiatric assessments. The areas of attentional capacity, intelligence, academics, visual-motor integration, verbal and visual memory, motor dexterity and speed, social-emotional and behavioral issues were examined. The team then discussed the appropriate diagnosis.

The diagnostic dilemma

The task of the clinician is to differentiate among the possible diagnoses suggested by history, behavioral observations, and analysis of the data. A Nonverbal Learning Disability can resemble other diagnoses, specifically, Asperger's Syndrome, Pervasive Developmental Disorder, or Attention-Deficit/Hyperactivity Disorder (ADHD). The difference in Roger's visual and auditory attention suggested that his difficulties were not exclusively related to a diagnosis of ADHD. Roger's history and evaluation were consistent with the characteristics of a Nonverbal Learning Disability. The diagnostic criteria for a diagnosis of Nonverbal Learning Disability are as follows:



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Definition of Nonverbal Learning Disability (NLD)

A Nonverbal Learning Disability refers to a subtype of learning-disabled children who have outstanding deficits in:

- Interpersonal relationships
- Visual spatial organization
- Organization and planning skills
- Flexible concept formation
- Study skills
- Specific academic areas
- Social judgement

Roger had difficulties in all these areas.

The profile of a child with a Nonverbal Learning Disability

Verbal Functioning

Verbal assets of NLD children include all areas of receptive language. NLD children are known to have excellent phonology or auditory conceptual abilities at the sound level of processing. In addition short term and long term auditory memory are areas of strength; vocabularies are well developed and expressive language is often elaborated. However **deficits** can be noted during early development in the motor planning of the speech/language process. As the NLD child develops language skills, often the rhythm or prosody of language is an area of weakness as is the "give and take" of language, the content grammar and structure – the semantics, syntax and pragmatics.

Auditory attention and concentration with verbal material are strengths for NLD children, but they are not as proficient when working on tasks that require either sustained tactile or visual attention. **Rote verbal memory skills** can be well developed, but they have much more **difficulty recalling pictorial or visual information**, particularly with only a brief exposure.

Nonverbal Functioning

Perceptual visual deficits are often present in NLD children. They can perform simple motor tasks within normal limits but have difficulty with complex tasks that involve both thought and motor activity. They work well with established routines, but have noticeable problems when presented with new situations or novel material.

Non-verbal problem solving, concept formation and hypothesis testing are

other problem areas. Deficits in dealing with cause-effect relationships, as well as the appreciation of incongruities and adapting to novel and otherwise complex situations, can be present. In these situations NLD students tend to rely on over-learned behaviors.

Academic Functioning

NLD children develop phonics skills slowly but once developed they do well with the mechanical aspects of reading. Word decoding and spelling come easily as does memory for rote material. NLD children may have early motor and motor planning difficulties with tasks such as handwriting, cutting with scissors or tying shoelaces, but once these skills are mastered, writing fluency is not an issue.

Persistent academic difficulties may be present with reading comprehension, computational mathematics, science and with mathematics that is spatially oriented, such as geometry. Sometimes an NLD child who has difficulty attending to visual details may make procedural errors. For example, she may have mastered basic math facts but may not recall the fact when needed in a specific situation, or she may not recall the order of operations when computing a long division problem. The child may misread operational signs and may misalign numbers in columnar operations.

Social-Emotional Functioning

Social relationships are a significant concern for NLD children. They may appear confused and may misinterpret body language and/or tone of voice. They do not perceive subtle cues in the environment, such as judging when an incident or reaction has gone far enough, or the limits of personal 'space.' These are all social skills that are normally grasped intuitively through observation, not directly taught.

Emotional development can be problematic for NLD children. They are particularly inclined toward the development of internalizing symptoms such as depression, withdrawal, and anxiety. NLD children can experience feelings of hopelessness, which can stem from being picked on for circumstances that he or she cannot help.

DIFFERENTIAL DIAGNOSIS

The following chart helps differentiate NLD children from children with Attention-Deficit/Hyperactivity Disorder.

Nonverbal Learning Disability	Attention-Deficit/Hyperactivity Disorder
Difficulty with spatial relationships and perceptions; frequently bumps into objects; may have difficulty with maintaining balance in seat.	Often fidgets or squirms; difficulty remaining still or seated when sustained visual attention is required.
Slow motoric performance on non-verbal tasks with hypervigilance to details vs. big picture.	Easily distracted and impulsive; poor planning and follow-through with details.
Talkative; reliant on verbal mediation; may not be aware of manipulation or deception.	Talks excessively; impatient and often loses things; may be manipulative and deceptive.
Poor social judgment; frequent avoidance of novel situations.	Seeks out novelty with enthusiasm; risk-taking behaviors.
Comorbidity with depressive or anxious symptoms.	Comorbidity with oppositional and defiant behaviors.

efficiency in processing certain stimuli, such that both hemispheres are not equally good at all tasks. For example, the right hemisphere has a greater capacity for handling complex visual-perceptual information because of its connections between different regions of the brain and appears better able to process new information. In contrast, the left hemisphere seems able to work more efficiently at applying already learned descriptive systems that use discrete units of information, such as language activities. While it is important to point out that this all-or-none approach is overly simplistic because both hemispheres generally play a role in most complex tasks, one hemisphere is usually considered dominant or more important for a specific task while the other hemisphere is non-dominant.

Damage to the right hemisphere can result in some complex syndromes, such as attentional disorders, visual-perceptual disorders, memory disorders, affective and emotional difficulties, deficits which can also be present in a child with NLD.

Options for intervention

Parent education regarding NLD is a high priority. Parents need a knowledge base in order to advocate for their child in effecting the appropriate accommodations and modifications in school. Planning should encompass school, social and family issues. Some special services to be considered are:

- Occupational therapy may be necessary to develop fine motor and visual motor integration skills.
- Early speech/language therapy can be helpful since very young children with NLD may have difficulty with the motor planning involved in speech production.
- Social skills groups may be recommended to cultivate social awareness, teach nonverbal behavior, encourage self-evaluation and promote specific problem-solving strategies.
- Cognitive behavior therapy (CBT) can be a vital component of a plan to help the child develop coping techniques.
- Because of the variability of individual strengths and weaknesses, some NLD children may benefit from a self-contained special education class while others should remain in a regular education class with support services.

The following chart helps differentiate NLD children from children with Asperger's Syndrome or Pervasive Development Disorder

Nonverbal Learning Disability	Asperger's Syndrome	Pervasive Developmental Disorder
Early speech and vocabulary	No language delay	Speech develops, then plateaus
Poor pragmatics and prosody	Poor pragmatics and prosody	
Normal to superior I.Q. VIQ>PIQ; verbal can be notably developed	Normal to superior I.Q. VIQ>PIQ	Normal I.Q., then fails to maintain commensurate with peers
Significant gross, fine and visual-motor problems; dysphagia	Clumsiness; gross motor is generally WNL; fine motor is poor	Coordination develops normally and generally remains WNL
Lacking verbal communication skills (receptive and expressive); naive; poor social judgment	Perserverating behaviors; restrictive areas of interest; hyperfocus on details	Restrictive; repetitive; stereotypical patterns of behavior

Causes of Nonverbal Learning Disabilities

NLD is described as a neuro-developmental disorder of the right hemisphere of the brain that is present at or soon after birth. Byron Rourke, a leading investigator in this field, has proposed

that NLD involves a destruction or dysfunction of white matter in the brain that is required for integration within the right hemisphere as well as a reduction of fibers that connect the two hemispheres. The right and left hemispheres appear to differ in terms of their

General strategies for parents and teachers

To avoid unintentional social blunders, NLD children benefit from a structured and supportive environment.

NLD children should be helped to understand the nature of their disorder, their strengths and weaknesses and ways of coping. They need to know that there is always a safe place, both in school and at home, and a specific person with whom they can talk about social and other issues.

Encourage independence gradually, making sure that supports are not removed before the child is ready.

Use language, the area of notable strength, to clarify questions and explain and interpret visual information. Many NLD children have specific and unusual passions. Don't avoid them; instead help a child learn more, research more and read more in those areas. As the child learns in his interest area, he will read material at higher levels.

Since NLD children often have motor coordination in addition to visual and spatial difficulties, they may have problems with team sports. Encouraging an individual sport is advisable.

Specific strategies in school

Make sure the classroom environment is not too visually stimulating.

The child may need a parent, a buddy or a teacher assistant to serve as a scribe for written assignments, such as book reports. With lengthy assignments, the child should learn to break down the assignment into meaningful chunks.

Tasks that require folding, cutting or arranging materials in a visual spatial manner require considerable assistance and may need to be broken down or, in some cases, eliminated.

Once the child has developed keyboarding skills, a laptop or word processor should be a bypass strategy for notetaking or essay writing.

Children with visual spatial difficulties and verbal strengths should be taught verbal mediation (self-talk). Teachers should model talk about maps, charts and

graphs as well as the steps needed to perform a motor activity.

To enhance math ability, use real life examples, lots of verbal explanation and hands-on experiences. Children with computational math difficulties may need to write problems on graph paper or ruled looseleaf paper held sideways to form columns and provide spatial structure.

A child with poor attention may need permission to take frequent breaks as she develops her ability to focus attention and concentrate.

Extra time and/or a buddy to get places are helpful for some NLD children with spatial difficulties.

Each child should be encouraged to generalize what he has learned. As he develops his knowledge base, he may take risks in his thinking, using old information in a new way to fit the new concepts he is learning or may attach new meaning to the old knowledge base.

Build opportunities for the NLD child to be a leader with other children, in small groups initially.

The NLD child will benefit from cooperative learning when grouped with good role models, but "discovery learning" is rarely the preferred method of instruction.

All in all, it takes a team - the parents, the child, and the school - to make the life of a child with a Nonverbal Learning Disability a fruitful one.

Suggested Readings and References

Allen, Kathy. Star Shaped Pegs, Square Holes. Order directly through Ms. Allen by e-mail: Caitlin35@aol.com

Green, Deborah. Growing Up with NLD. Silicon Heights Computers: 1.800.654.6623
Levine, Mel. (1994) Educational Care: A System for Understanding and Helping Children with Learning Problems at Home and in School, Educators Publishing Service, Inc.: MA

Rourke, Byron P. (1989) Nonverbal Learning Disabilities: The Syndrome and The Model, Guilford Press: New York.

Thompson, Sue. (1997) The Source for Nonverbal Learning Disorders, Linguistic Systems, 1997.

Other resources

www.nldline.com offers an information packet and a calendar of NLD-related events.

NLD Hotline: (831) 624.3542

NLD-In-Common: listserv which parents can join and talk to others interested in this subject. To join, go to:

<http://www.onelist.com>

Click on the NEW MEMBER button.

SHARE Support, Inc. (sponsors an annual NLD Symposium and 4 newsletters)
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About the authors

Stephen A. Sands, Psy.D., Assistant Professor in the Departments of Psychiatry and Pediatrics at the New York University School of Medicine, is a pediatric neuropsychologist on the staff of the Child Study Center. Dr. Sands is also the Director of the Behavioral Health Team at the Stephen D. Hassenfeld Children's Center for Cancer and Blood Diseases at the NYU Medical Center, which provides support for patients and their families throughout medical treatment. Dr. Sands is actively involved in research regarding the late effects upon quality of life and neurocognitive functioning of the treatment of pediatric oncology patients and has published and presented extensively on this topic.

Susan J. Schwartz, M.A. Ed., is the Clinical Coordinator of the Institute for Learning and Academic Achievement at the NYU Child Study Center. Ms. Schwartz, a Learning Specialist, has expertise in the assessment and treatment of children with language, reading, writing, math and study/ organizational difficulties. She has worked extensively with children and adolescents and has lectured widely. Her special interests include nonverbal learning disabilities, phonological awareness and development of metacognitive abilities for adolescents.



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Child Study Center

550 First Avenue New York, NY 10016 (212)263-6226



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