Nonverbal Learning Disabilities

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The term “learning disabled” refers to a heterogeneous group of individuals who have problems processing one or more types of information. Although they have normal sensory acuity, at least average intelligence and the motivation to learn, there is a discrepancy between their ability and performance in one or more areas such as listening, speaking, reading, writing, mathematics, reasoning and problem-solving. While verbal and academic disorders cannot be minimized, we have long been concerned with those which are predominantly nonverbal in nature because of the impact on social perception, independence and interpersonal relationships.1,2 Follow-up studies of children as well as a recent analysis of adults referred to our clinic indicate that verbal disorders are among the most prevalent but that nonverbal disabilities are often the most debilitating.3 In addition, Behrens4 found children with nonverbal problems made less progress in remediation than those with language and reading disorders.

While the symptomatology varies somewhat, nonverbal disorders are frequently manifested in disturbances of spatial orientation, body image, facial recognition, visual-spatial-motor organization, social interaction, and problem-solving that requires observation, analysis and synthesis.5 Some, but not all of these problems are found among individuals who have acquired right hemisphere dysfunction or damage.6

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Typically these problems interfere with some academic subjects including handwriting, arithmetic, and those requiring visualization or visual-spatial-motor integration. We also have observed “gaps” in language and reading comprehension which are secondary to the nonverbal deficits. That is, because of their disturbances in body image, spatial orientation, or visualization they may not comprehend words such as “between,” “behind,” etc. Similarly, older students may have particular problems in geometry because they cannot perceive or visualize figures accurately.

Equally important, however, is the impact on social interaction and independence. And, since many families seek guidance from psychologists and others in the mental health field, the purpose of this article is to highlight the characteristics and needs of this population.

Certain types of nonverbal problems have been recognized for many years. For example, the “brain injured” children described by Strauss and Lehtinen were characterized by their perceptual disturbances, disorganization, and poor coordination.7 While their
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difficulties were usually manifested in academic underachievement, their disorganized behavior and fragmented concepts were of concern to their families, teachers and psychologists. The Other Child was co-authored by a parent and professionals to provide an understanding of these children.8

In recent years with advances in the field of nonverbal communication9-11 more emphasis has been given to the symbolic, conceptual aspects of nonverbal learning disorders.2,12-16 Some of these investigators, together with clinicians in the field, noted problems in understanding facial expression, gesture, and other nonverbal signs which interfered with the pragmatics of communication.

In general, individuals with nonverbal learning disabilities are characterized by their high verbal and low performance scores on the Wechsler Intelligence Scale for Children (WISC).17 At times the discrepancies may be as large as 40 or 50 points. These discrepancies result in very uneven patterns of development. Thus, language may be age appropriate, or even accelerated while play, self-help skills, and social maturity are below expectancy.

A verbal performance discrepancy on the Wechsler Intelligence Test is not necessarily an indication of a specific learning disability. There are many reasons for such discrepancies including sensory disturbances, motor handicaps, and cultural differences. Thus, the diagnosis involves a careful case study, a comprehensive evaluation of learning aptitude, behavior, and all areas of potential underachievement including oral language, reading, written language, mathematics, and nonverbal processes. As with most diagnostic studies, the case history is an important part of the evaluation since it provides data regarding the chronicity of the problem, symptomatology, and reactions to the handicap.

Most professionals in the field of learning disabilities now acknowledge the fact that the problems are lifelong. Even though these people make substantial gains, the residuals of the disability persist. Thus, they experience repeated frustrations, failures, and problems at work. While the overall pattern of high verbal/low performance ability is manifested throughout life, the specific concerns vary with age and expectations. The remainder of this article provides a summary of the symptoms observed by both parents and professionals.

SYMPTOMATOLOGY DURING EARLY CHILDHOOD

Parents of children with nonverbal disorders frequently report that they knew relatively early that something was wrong. Several in our preschool clinic said they knew by 6 to 8 months that the child was not responding as expected. They were somewhat passive and failed to engage in exploratory play. A few said these babies did not respond to the cuddling and "cooing" as much as their siblings.

Other families became concerned when their children were about 3 years of age or entering nursery school programs. Often they observed problems in self-help skills including eating, dressing, and learning to climb stairs. Many had problems learning to play. They could not use the typical toddler toys such as blocks and puzzles nor did they enjoy coloring or drawing. Yet verbal skills were average or above. Typically, the children overcompensated verbally and some began to read during the preschool years even though they had rather severe visual nonverbal deficits.

Their visual-spatial-motor disorders resulted in rather awkward, clumsy behavior. These, in turn, often resulted in reprimands for spilling, breaking, or destroying things as well as countless frustrations and negative feelings. The parents also reported that they could not leave the child unattended because they did not observe potential hazards such as pointed instruments, broken stools, etc.

Neighborhood birthday parties or family dinners were often problematic and some parents finally decided to avoid them. This practice, however, created more isolation for the child and more dependence upon the parents.

Discipline was often difficult because the children were somewhat deficient in causal thinking and time orientation. The secondary consequences are quite predictable. Parents felt inadequate and guilty because of the child's behavior. As they tried to change their management techniques, however, they became less consistent which led to more problems.

Our studies of parent-child interaction indicate that families need specific guidance to help the child learn to explore, to play, and to participate in various nonverbal activities. Usually rules and routines must be rehearsed verbally because of the child's poor observational skills. Feedback regarding performance needs to be highly specific. Simply telling the child not to "do that again" is insufficient. "That" often requires the ability to "size up" a situation to realize how it is similar to others.

Results of our 2-day diagnostic evaluations, diagnostic teaching and several studies done by faculty and students confirmed many of these observations on standardized tests and research instruments.

An analysis of the records of a group of 20 preschoolers with primary nonverbal disabilities indicated they had verbal/performance discrepancies on the Wechsler ranging from 15 to 52 points9 (Table and Figure 1). Diagnosticians reported many had difficulty comprehending nonverbal tasks—that is they continued on page 137.
did not seem to "get the idea." Problems with picture interpretation were also noted on language tests that required pointing to or naming figures. These problems were further corroborated by teacher observations. For example, a 6-year-old with excellent language scored below average on picture vocabulary tests, not because of verbal problems but because of nonverbal disabilities. For instance, he called a key a "6," a rural mail box a "piece of toast," and spectacles an "8." In none of these cases was there any indication of provocative behavior. The children were eager to please and were trying to perform as well as they could but their misinterpretations of pictures and experiences often resulted in rather bizarre responses. Particular problems were noted with incomplete pictures or situations in which the children had to interpret the whole from the part. We observed similar behavior in a few clients with acquired brain damage.

Several studies of play with normal and learning disabled children indicated the latter group engaged in less extended exploratory play and elaborated pretend behavior. They also appeared to profit less from their own sensory-motor exploration. For instance, during sand and/or water play they did not notice why sand would not go through certain containers. They did not "solve the problem" when we plugged a funnel to prevent water from going through. As a result their causal thinking was below that of their normal peers.

In a study of haptic perception in which we videotaped the hands of normal and learning disabled preschoolers while they felt familiar and unfamiliar objects, we observed less active searching for criterial attributes and more random, pressing, and squeezing movements among the learning disabled. Perhaps they did not have sufficient imagery and/or background knowledge on which to base their explorations. That is, they did not know what to search for.

SYMPTOMS IN LATER CHILDHOOD AND EARLY ADOLESCENCE

By the time children enter school they typically have relatively well-developed concepts and language so they can tell what is happening in a complex picture, relate incidents and organize pictures to convey a story line. While children with verbal disorders also have difficulty with these tasks, their problems are somewhat different from those with nonverbal disabilities. Those with language disorders may understand what they see but cannot retrieve and organize words to convey what they know. In contrast, those with nonverbal disabilities tend to misinterpret what they see. Consequently there is a lack of synchrony between the referent and the language. Concepts appear to be somewhat detached and relationships between objects or events are not examined carefully. For instance, a 7-year-old was presented with a large picture of a house on fire and three firemen with hoses standing nearby. His initial response was "They are having a birthday party—see the candles." While various hypotheses could be given for this response, the clinician simply pointed to relevant objects in the picture such as the firemen and the source of the flames and he immediately corrected himself. In this instance, the boy's verbal IQ was 109 and performance was 54. The erroneous response to this picture was not an isolated incident. He had more difficulty, for example, on reading comprehension tests which required matching words and pictures than when matching words to synonyms. He frequently missed the point on filmstrips and television programs. This may be due to the fact that certain time and space "codes" on TV are somewhat difficult to interpret. Greenfield found, for example, that young children and people from other cultures had difficulty understanding size relationships between objects with panning and zooming of the cameras. Speed of perception also may be a factor in such behaviors. We found clinically that children with these problems could interpret facial expressions when pictures remained present for inspection but they could not do so in natural settings. They are not afraid to look; they do not know how to look. In some instances, they do not know which features are relevant. They cannot tell when someone is surprised, angry or embarrassed unless someone tells them.

As one might expect, the social interaction of these children becomes increasingly tenuous. Because they do not know how to play well, they may be rejected and isolated. At other times, their play is disruptive because of poor visual-spatial integration. Unintentionally, they destroy constructions with blocks and other projects. A few may become class clowns, not because they intend to be funny but because their rather idiosyncratic behavior evokes laughter from others.

Additional social problems arise if they have facial recognition difficulty. The boy whose psychological profile is shown at the bottom of the Table did not recognize family, relatives or friends until they spoke. His draw-a-person is shown in Figure 1. Furthermore, during remediation, we found he did not recognize himself in a photograph. Adults with acquired right hemisphere disturbance frequently describe the devastating impact of such problems. A 23-year-old said it is "terrible to walk down the street and not know people until they talk to you—sometimes people think I am being aloof or that I am angry at them if I don't speak." While these problems may be less noticeable in young children, they should be considered when studying those with low performance intelligence.

When planning programs for this population both the primary cognitive deficits and secondary emotional needs should be investigated. Most need help...
with both academic and nonacademic skills. Often they are easily mainstreamed in courses such as reading and social studies where they do well. Most, however, have difficulty with handwriting, mathematics, and the traditional extracurricular activities such as physical education and art. Special emphasis should be given to curricular activities that involve spatial visualization and the use of graphs, measuring devices, and figures in textbooks. In mathematics they may memorize facts and rules. Yet, if asked to “image” problems such as 4 times 4 they cannot draw the appropriate sets of dots or lines.

Many are unable to estimate size or visualize distance even though they can recite facts such as the number of inches in a foot or yard. A 12-year-old thought that one-half foot and one-half mile would look the same because they were both halves.

Haptic perception and proprioception also may be impaired. Thus, when they are asked to feel objects (e.g., coins) and indicate which are larger, they may be unable to do so. Some cannot identify coins until they read the labels on them.

All of these problems may create more social problems and dependence. For instance, a 9-year-old from our clinic could still not cross a street by himself. In remediation we found he could not use environmental cues to estimate the speed of oncoming traffic, and occasionally was unable to determine whether the cars were moving toward or away from him. Despite these severe problems he had above average verbal ability and had learned two foreign languages. His scaled scores on information and vocabulary subtests of the verbal IQ were both 14 on the WISC whereas overall performance IQ was only 48. Object assembly and mazes subscale scores were each 1!

Socially this boy and others are often ill at ease. Their eye contact is somewhat unnatural, as if they did not know how or where to look. Prosodic features of language also may be atypical. Some laugh and talk too loudly; others use little inflectional variation. Some do not use social distance cues appropriately and get too physically close to people. And, the problems are compounded because they fail to observe the negative reactions from others. Because of their multiple problems they do not or cannot attend to multiple facial expressions, body language, vocal inflection, and proxemic (distance) features that convey meaning.

Thus, we have recommended the use of videotapes to help them learn to attend to relevant social cues from others.

*Figure 1.* Drawing by the 12-year-old boy with nonverbal learning disabilities.

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**TABLE**

**Psychological Test Profile of a 4-year-old Girl**

<table>
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<th>Performance IQ 61</th>
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<td>Block Design</td>
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<td>Mazes</td>
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<td>Sentences</td>
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**Psychological Test Profile of a 12-year-old 6th Grade Boy**

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Wechsler Profile

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<td>Subscale Scores</td>
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2

MY HANDWRITING IS A SIO CROSS IT HAS HELD ME BACK THROUGH OUT MY FUTURE LIFE.

Figure 2. Intelligence profile and penmanship of a 33-year-old male with a nonverbal learning disorder.

As stated previously, they do not learn well from observation or from implicit rules. Therefore they need explicit guidance, verbally mediated looking, and directions. However, overly direct teaching may lead to rigidity. Thus, students are encouraged to scan and determine what is relevant in a situation.

Their performance in academic subjects may be somewhat uneven. While most are excellent decoders they often have difficulty with higher level comprehension and inferential questions. In literature they may be unable to perceive another person's point of view. As a result some appear narrow-minded and egocentric. Their spelling and written syntax is adequate but some use a rather superficially high vocabulary. In addition, they do not adjust easily to audience needs. Frequently they use overly formal language in both written and oral communication.

In social situations they do not know when people are teasing or being sarcastic. Many lack a sense of humor and have particular problems with cartoons. Given the expectations from peers, teachers, and parents, it is evident these young people can be victims of rather intense criticism and may become social isolates. Yet, it is our impression their needs are different from many of those receiving special education services or psychotherapy. Their feelings of rejection and inadequacy should be considered in determining the total disability.

In order to feel better, the nonverbal learning disabled student needs to be taught age-appropriate social skills in a warm, supporting environment. The instruction should foster good problem detection, not just problem-solving. Rather than being told what to do or not to do, the student should be encouraged to think for himself, to formulate hypotheses, and to self-monitor his own behavior. Verbal problem-solving however, is insufficient. Some of these students can tell what one should do if—or what might happen when—and yet in the real world they do not detect relevant features on which to base decisions. For this reason we recommend videotapes and group sessions where they have an opportunity to observe their own behavior in relation to others.

PROBLEMS IN ADULTHOOD

Most professionals in the field of learning disabilities and many parents of these children now recognize that the problems do not go away. While progress can be made, residuals of the problems remain. In a recent volume on adults we reported that approximately 18% of 93 adults we studied had significant nonverbal learning disabilities.

A typical psychological profile and a writing sample of a 33-year-old are presented in Figure 2. While this man wanted help with writing and arithmetic, he also wanted assistance with many life skills such as tying a necktie, using keys, packing cartons, and folding papers to fit in various size envelopes. He had gone to a social worker who, in turn, had referred him for cognitive assessment.

Women with nonverbal disorders often have significant difficulties in the kitchen and in general home management. They may be unable to use measuring devices, manipulate utensils with dexterity, double recipes, or estimate time. Some were incapable of setting clocks, timers, and other devices that would normally be of help.

Most were in jobs that required verbal skills, but invariably some aspect of their disability interfered with performance. For example, the man whose profile is shown in Figure 2 had been on the same job for 9 years but people had adjusted to his poor writing in the office. In order to be considered for a higher level position, however, he needed better visual-spatial and computation skills.

Many adults also had difficulty prioritizing daily...
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activities at work or at home. Both their time disorientation and visualization problems interfered with performance and, consequently, they needed good supervision. Despite their problems, many employers responded to their strong motivation, desire to work, and persistence. However, speed of performance often created problems, and in some instances led to dismissal. Repeated job losses often stimulated a search for counseling and mental health services.

Recently we held a series of meetings with learning disabled adults and several professionals from the mental health field in order to exchange notions about the effectiveness of treatment. In general, the adults reported that counseling had been helpful in dealing with their frustrations but they still needed work on the disability. They urged most psychiatrists to provide more help for immediate problem solving than for resolution of previous conflicts.

We concluded that these adults needed a better understanding of their overall strengths and weaknesses in order to anticipate possible problems at work and in social situations. As a consequence, early detection by pediatricians and more intense special education services are warranted for this peculiar but not rare form of nonverbal learning disabilities.

REFERENCES

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