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CLINICAL PSYCHOLOGY

Original Article

Learning Disabilities in Adolescence

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This article presents a definition of learning disabilities appropriate for adolescents. From a review of the research literature, a framework of four subtypes of learning disabilities is presented which describes deficits in the adolescent's processing, retrieval, and reproduction of stored verbal and visual information. Significant psychosocial adjustment problems experienced by learning-disabled adolescents are also reviewed, with emphasis on their higher rates of antisocial behavior, lack of internal control, and greater avoidance of frustrating learning tasks. Implications of this literature review for practicing health professionals are discussed.

Learning disabilities in childhood and adolescence are conditions that have attracted increasing levels of clinical and research attention from educators, psychologists, and physicians during the past 20 years. This interest has been stimulated by the puzzling anomaly of children who have been unable to maintain usual academic achievement, despite possessing normal intelligence and an absence of any other significant visual, hearing, motor, or emotional disorder.¹

The diagnosis and treatment of learning disabilities is often

difficult and incompletely understood. The diagnosis of learning disability has been utilized with great variability by various professionals. Grill found that of 130 adolescent students identified as learning-disabled by schools, only 18% fulfilled the author's minimal definition of learning disability.² Many children in learning-disability classrooms have actually been found to be mentally retarded children, slow learners with no specific disability, or children with behavioral problems.³

The assessment process for adolescents is even more uncertain than for younger children. By the time the learning-disabled youths reach adolescence, they have had almost a decade of failure experiences in the educational system. Finding they cannot succeed as well as their equally intelligent peers, they often give up and no longer attempt to achieve in school. The professional diagnostician must decide whether the frequently observed lack of motivation is a secondary result of a learning disability or if poor motivation actually initiated the adolescent's cycle of inadequate achievement.

In reaction to this diagnostic confusion, the following definition, which has been adapted from Goodman and Mann's work,³ is proposed: An adolescent should be classified as "learning disabled" if he fulfills the following criteria:

- The student must have a full-scale IQ score of 90 or above, as measured by the Stanford-Binet or Wechsler Intelligence Scales.
- The student's academic performance in mathematics or

language skills must (1) lag at least two years behind the student's expected grade placement based on his chronological age, and (2) fall below the beginning seventh-grade level in both.

- The student must not suffer from other disorders that take priority in explaining the development of his significant school failure. These other disorders include: sensory deficiencies, physical impairments, organically induced behavioral problems, socio-cultural problems, emotional disturbances, or motivational problems. However, as mentioned previously, it is likely that learning-disabled adolescents will have secondary emotional and motivational difficulties that are the result, but not the initial cause, of their academic frustration. Some of the learning-disabled adolescents also will display attention-deficit disorders, although this is not a necessary characteristic of the disorder.

To further elaborate our understanding of adolescent learning disabilities, this article will review the research literature to outline subtypes of learning disabilities and the psychosocial consequences of the learning disability for the adolescent.

Subtypes of Learning Disabilities in Adolescence

In recent years, research efforts have begun to assess whether learning disabilities in adolescents change in a developmental manner, like so many of the other physical and psychologic aspects of the adolescents' lives. The primary issue at the basis of these investigations is whether learning disabilities

represent a maturational delay in specific perceptual, cognitive, or motor abilities, or whether irreversible deficits exist which would not change spontaneously during adolescent or even adult years.

Children who have been diagnosed as learning-disabled while in elementary school are highly likely to still have learning difficulties in high school. Ackerman, Dykman, and Peters^{4,5} contacted and reevaluated 76% of a sample of learning-disabled boys whom they had initially assessed four years earlier. At the second testing, when the boys were 14 years old, only 15% of the boys had improved to a normal level of academic functioning. The rest of the adolescent sample still demonstrated underachievement in the areas of oral reading, spelling, and arithmetic, and had markedly slower reaction times than did a control sample. Certainly, by the time the majority of these boys had reached early adolescence, their learning deficits had not faded away or been compensated for.

While Ackerman and co-workers³ concluded that these persistent deficits were manifestations of a generalized learning disorder rather than specific learning disabilities, other researchers have concluded that several subtypes of learning disabilities exist for adolescents, and that these subtypes have different developmental histories. The work of several researchers suggests a framework of at least four subtypes of adolescent learning disabilities.^{6,7}

Visual-Perceptual Functioning—The first subtype involves deficits in visual-perceptual functioning and, of all the subtypes, these deficits are most

likely to improve before and during adolescence.^{6,8} Children who demonstrate these visual deficits have difficulty perceiving, storing, and retrieving visual stimuli, and have particular difficulty with such prereading tasks as letter recognition and word recognition. As early as age 9, dyslexic boys, as a group, no longer had significantly worse perceptual-motor skills than normal readers.⁸ The implication, then, is that children who once had visual-perceptual deficits have generally attained the basic perceptual skills for reading when they reach early adolescence.

Linguistic Processing—Linguistic processing deficits make it more difficult for the adolescent to understand increasingly complex communications directed to him.^{7,9} Since these adolescents do not adequately comprehend the grammatical structures (lexical syntax) of sentences, they are unable to store the material in their memory and, therefore, have corresponding losses in verbal fluency. These deficits appear to be related to difficulties in abstracting, comparing, and synthesizing information.⁷ Several recent studies have disputed previously held contentions that these adolescents also had greater difficulty processing nonlexical aspects of speech (ie, loudness and stress on words or syllables), since their understanding of speech inflection and word morphology appeared to be comparable to that of other adolescents of similar intellectual capacity.^{9,10}

Retrieval—While an adolescent may have adequate abilities to process and store incoming verbal information, he may display a third subtype of learn-

ing disability related to an inability to effectively and efficiently retrieve the stored information. These adolescents tend to use inappropriate words instead of the ones they mean (paraphasia), cannot always recall names, verbal labels, or letters (anomia, dysnomia),^{6,7} and recall verbal labels more slowly.⁴ These adolescents have particular difficulty recalling rote sequences of letters, words, and numbers, even though their short-term memory and long-term memory of meaningful information might be adequate. When given a word, the adolescent can often recognize the general category it belongs to (eg, "fruits"), but have great difficulty locating the word's opposites and synonyms.¹¹ Greater memory difficulty has been noted when the information is more exact and detailed.⁴ Therefore, tasks involving spelling of words and memory of arithmetic facts are quite difficult for this type of learning-disabled adolescent. Within the memory storage of these learning-disabled adolescents, there appears to be weak, limited access to pieces of stored information, with little organization and interconnection between memory traces.

Articulate Production—The fourth subtype of learning disabilities can be present in adolescents who adequately recognize and process complex verbal information, and who can retrieve information from memory and recognize letter sequences in words, but who display articulatory and graphomotor discoordination.⁶ The speech of these adolescents is difficult to understand, accompanied by buccal-lingual dyspraxia. The speech musculature is poorly developed, and most of

these adolescents have difficulty with motor tasks requiring rapid protrusion of the tongue. This deficit inhibits learning of phonics skills and affects the adolescent's oral reading skills.

This framework is meant to be suggestive and is not necessarily totally inclusive, nor are the subtypes necessarily mutually exclusive. Knowledge of the etiologic or underlying factors is even more tenuous. The chief cause of learning disorders has been described as "an inability or an unwillingness to sustain attention."⁵(p593) The fact that learning-disabled children often have poor selective attention in learning situations has been well documented.¹² However, poor attention appears to be a correlated condition rather than a causal explanation of learning disabilities, since not all learning-disabled adolescents also have attentional deficits. To account for the adolescent's learning disabilities and poor attention, various explanations have included: (1) autonomic underarousal,⁴ especially in the frontal association cortex, utilizing auditory, cortical-evoked potentials¹³; (2) deficits of the left hemisphere which hamper information sequencing and linguistic structuring,^{4,14} similar, perhaps, to the lesions found in the aphasic's left hemispheres;⁷ and (3) impulsive cognitive tempo, characterized by learned, error-prone, problem-solving strategies.^{12,15} At this stage of research into the adolescent's learning disabilities and accompanying attentional deficits, clear universal causes are not apparent.

Of the learning disabilities evident in these four areas, the first type most clearly represents a developmental delay

that resolves for most children as they enter and move through the adolescent years. However, whether these adolescents learn to become literate readers is dependent on whether verbal-conceptual deficits or secondary psychologic reactions exist. Further research, especially of a longitudinal nature, is needed to determine if the remaining three subtypes represent chronic deficits, or whether they also may resolve in later adolescence or early adulthood. At this time, the question as to whether the latter three types of learning disabilities are developmental delays or irreversible deficits remains unanswered.

Adjustment of Learning-Disabled Adolescents

In light of the continuing learning and attentional deficits encountered by learning-disabled adolescents, a more comprehensive understanding of their social and emotional adjustment is in order. In actuality, adolescents with learning disabilities display a complex interaction between the physical, cognitive, emotional, and behavioral aspects of their lives. While the learning difficulties and secondary emotional reactions were likely originally initiated by physical and cognitive deficits, the links between these elements may not be so causally clear for the adolescent. Thus, negative emotional reactions may be responsible for maintaining an adolescent's learning difficulties, even though some of his original developmental delays may have improved. Particularly, concern has developed about how the presence of learning disabilities affects the adolescent's vulnerable, devel-

oping sense of identity,¹⁶ and psychosocial maturation.¹⁷

In a longitudinal study of learning-disabled male adolescents divided into three activity levels (hyperactive, normoactive, hypoactive), interpersonal acting-out behaviors were emitted by nearly half of the hyperactive adolescents, but rarely by the other two types.⁵ Such behavior frequently led to conflicts within the home, school, and community. Antisocial behaviors may become evident as juvenile delinquency. Although it is not presently certain what percentage of learning-disabled adolescents eventually are adjudicated as juvenile delinquents, several studies of delinquent populations have revealed that delinquents perform significantly worse than a matched control sample on a neuropsychologic battery,¹⁸ and 79% of the delinquents in a residential treatment program were found to have specific learning deficits in the area of auditory-sequential memory, visual-motor coordination, and visual-spatial orientation.¹⁷ Such findings suggest that at least some of the observed acting-out behavior of delinquents may be due to the adolescent's frustrations with learning difficulties.

Internally, some learning-disabled adolescents have been found to cope with these frustrations in other, somewhat less obvious, maladaptive ways. After years of failure and frustration with academic tasks, many adolescents have developed a poor self-image,¹⁹ although they do not perceive themselves to have an apparent physical disability.²⁰ At this time in their lives when peer relationships ordinarily become increasingly important, the learning-dis-

abled adolescents face an additional threat to their self-esteem, since they perceive themselves as being less desirable to their peers,¹⁶ and have difficulty eliciting positive responses from others.²¹

Some professionals have experienced such extreme concern over the adolescent's self-esteem that they have advocated that adolescents should have a right not to be forced to read, and thus avoid further humiliation.²²

Along with these feelings of lowered self-esteem, learning-disabled adolescents in general expect that they have less control over attaining satisfactions and goals than other adolescents,^{12,23} and feel more hopeless.¹⁹ They are less able to make longer-term plans, as reflected in their immature career planning.²⁴ These attitudes of hopelessness can, in fact, be reinforced and maintained by the adolescent's teachers²⁵ and family. Since the family has stabilized their perception of their child as a failure, they likely will have difficulty altering their perceptions of him spontaneously, even if his developmental delays subside. Thus, a situation develops in which the adolescent, his family, and his teachers all maintain minimal expectations and goals for the adolescent, leading to self-fulfilling prophecies of school failure. For some learning-disabled adolescents, the feelings of helplessness and alienation can lead to pronounced depression. Adolescents with visual-motor deficits have been found significantly more often than a matched control group among suicide attempters.²⁶

Because of the sense of helplessness and feelings of depres-

sion, defensive coping styles develop among these adolescents. The most commonly seen defensive style is avoidance of academic tasks, with reduced motivation to endure educational remediation.²⁷ Learning-disabled adolescents also display subtle denial mechanisms, as they are less able to perceive errors in their own work than in others' work.²⁸

Remediation of the Adolescent's Learning Disabilities

Little research on the treatment of learning disabilities in adolescent populations is available, although this could be a potentially critical period of life in which to create positive changes.²⁹ Medical treatment for hyperactive children has often included methylphenidate (Ritalin), but historically this drug has been used infrequently with adolescents. Although a recent uncontrolled study of the effects of methylphenidate on adolescents has suggested that some adolescents improve on behavioral ratings and academic achievement after use of the drug,³⁰ other controlled studies with younger children have only found behavioral improvement, and not academic improvement, with the use of methylphenidate.³¹ The latter authors concluded "that Ritalin should not be used to treat learning disorders."³¹

In terms of educational remediation, greater use of visual images to improve the adolescent's recognition of word and letter sequences has been recommended.⁴ It has also been strongly suggested that children and adolescents need greater exposure to richly varied oral lan-

guage in order to better perceive complex grammatical and cognitive structures.⁷ Both of these suggestions could also be used preventively with young children.


Perhaps the most critical concern for the remediation of these disabilities will involve creating the motivation, nondefensiveness, and positive expectations within the adolescent and within his family and teachers to carry through with a treatment program. These factors may well be more important than technical remedial know-how. College students acting as tutors have been found to significantly increase the reading achievement of reading-disabled adolescents, primarily relying on behavior modification procedures.²⁷ Frequent one-to-one sessions with teachers and trained tutors would be ideal for learning-disabled adolescents, since their external locus of control¹² makes them potentially more responsive to the external motivation of a teacher's social reinforcement. The goals for such sessions would include isolating the adolescent's strengths, while shaping his motivation and greater sense of perceived control; reinforcing more accurate self-monitoring of the errors in his own work²⁸; reinforcing improved selective attention through verbal rehearsal strategies³²; and improving his inhibition of impulsive responses through self-instructional training and active use of problem-solving strategies.¹²

Implications

For physicians and other professionals treating adolescents, several implications for referral, medication, and patient educa-

tion emerge from this review. First, when significant underachievement is noted in an adolescent with approximately average intelligence and normal neurologic functioning, specific learning disabilities may be evident. Referral for appropriate psychologic and educational evaluation is in order. To ensure appropriate responses to these referrals, the physician can act as a concerned advocate on behalf of his adolescent patients.

Second, careful consideration should be given to whether or not a medication trial would be needed for a learning-disabled adolescent with attentional deficits. Even if the medication decreases his activity level, it may have no effect on his academic achievement.

Third, a careful explanation of the characteristics of adolescent learning disabilities should be given to the adolescent, and then to his family. When talking with the family, reinforcement of hope and of the possibility of improvement will help to change the current homeostatic view of the adolescent's defect. The professional must be sensitive to the family's dynamics, and to how the adolescent's change from a "defect" status affects other family members. In fact, the family may initially resist such a change. When talking with the adolescent, focus should be centered on increasing his motivation for learning, positive self-esteem, greater sense of control, and improved peer relationships. 

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there is less and less rejection of female physicians by boys.

Another interesting question was "If you are counseling sexually active adolescents, what do you tell them are their 'valid options' to sexual intercourse?" I believe many adolescent girls have intercourse because they fear the boy will not date them if they do not participate. A girl should realize she has the option of saying "NO" and that her world can and will go on, that she can feel good about the decision, and that being virginal does not make her "odd." Another option is to decrease the physical and emotional opportunities for intercourse by taking part in group activities that do not lend themselves to privacy. Options are closely related to values, and counseling is directed toward establishing values acceptable to teenagers, and supporting them in these decisions. Boys also have these problems. One adolescent boy said, "Yeah, I've had sex a couple times, I know I can do it, I like it, but now it isn't that big a deal. Why should every date have to end in trying to see if you can have sex? I just don't believe that the only reason for going with a girl is to see if you can screw her."

My overall concern after reading many of the questions and listening to others is that many physicians caring for teenagers do not feel comfortable talking about sexual matters, and some have no idea how to establish rapport with an adolescent. Could these deficiencies, assuming they exist, be corrected by "educational sessions" of very small groups of physicians? I don't know, but readers' comments are welcome.

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USE OF HYPNOSIS TO IMPROVE ACADEMIC ACHIEVEMENT

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Our approach differs from those previously investigated in that we did not seek to achieve learning in the hypnotic state, but rather, we improved the learning environment. The hypnotic technique allowed the student to exclude interfering thoughts and environmental stimuli, and thus improve his ability to study.

Unfortunately, the lack of a control group in this study design makes it impossible to define the effect of other factors such as motivation. Studies now in progress will seek to more clearly delineate their contribution. However, hypnosis has been demonstrated to be a useful adjunct to learning when it is used to improve the learning environment. 

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