

# LEARNING DISABILITIES AND EARLY INTERVENTION STRATEGIES

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## **Statement by G. Reid Lyon, Ph.D.**

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DISABILITIES AND EARLY INTERVENTION STRATEGIES*  
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Good Morning Chairman Castle and members of the Subcommittee. I am Dr. Reid Lyon, Chief of the Child Development and Behavior Branch at the National Institute of Child Health and Human Development (NICHD) at the National Institutes of Health. I am honored to have been asked by the Subcommittee to address issues relevant to learning disabilities (LD) and early intervention strategies and how research bearing on these issues can serve to inform the special education referral and identification process.

The testimony that I will present for the record this morning will build on the compelling testimony presented by Dr. Pasternack, Assistant Secretary for the Office of Special Education and Rehabilitation Services (OSERS) within the U.S. Department of Education. I would like to note that it is a new day in Washington when you can observe two federal departments - the Department of Health and Human Services and the Department of Education - working collaboratively to identify and address issues that are critical to the health and education of our nation's children. For example, for the first time, the NICHD and OSERS are working hand in hand to ensure that the best research supported by both agencies is integrated and deployed to answer important questions about how to best educate our youngest citizens. Moreover, under the leadership of Secretary Thompson and Secretary Paige, the NICHD is also working closely with Dr. Wade Horn from the Administration for Children and Youth (ACYF), Dr. Susan Neuman from the Office of Elementary and Secondary Education and Dr. Russ Whitehurst from the Office of Educational Research and Improvement. This collaboration is designed to develop a coordinated effort to ensure that children from conception to adulthood have access to the most supportive and instructive early childhood environments, preschool, and kindergarten experiences that lead to optimal cognitive, social, emotional, and academic development. Let me now turn to the critical issues to be addressed today.

## **The Critical Need to Improve Identification and Instructional Practices for Students with LD**

The Subcommittee's focus today on how best to identify and provide effective services to students with LD is critical given that it is the most frequently identified class of disabilities among students in public schools. This focus takes on additional importance because the identification and provision of services to students with LD typically takes place within a context of persistent debate about (a) the definition of the disability, (b) the diagnostic criteria and assessment procedures employed in the identification process, (c) the content, intensity, and duration of instructional practices provided, and (d) the policies and legal requirements that guide the identification and education of students with LD. What is clear, however, is that Learning Disabilities are real and that objective criteria exist for their identification. The major issue is that the underlying conceptual model for LD is more like obesity or hypertension, not measles or mumps. LD is a dimensional disorder meaning that it exists along a continuum of severity and is not an "either you have it or do not have" type of disability. In this way, it is similar to hypertension or obesity.

### **Increase in Identification of LD at older Ages Not Accompanied by Increases in Student Learning**

Since the 1976-1977 school year, when Congress first required public schools to document the number of children with LD, the share of school-age students identified as LD has risen from 1.8 percent to 5.2 percent. Learning disabilities now account for more than half of all students enrolled in special education programs, an increase of 22 percent over the past 25 years. In the past decade alone, the number of students ages 6 to 21 identified as LD under IDEA has increased to 38 percent. The largest increase, 44 percent, is among adolescents ages 12-17.

Unfortunately, this rise in the identification of students with LD does not lead to improvements in learning, particularly in older students (9 years of age and above) and particularly in reading skills. For example, Eric Hanushek and his colleagues found that placement in special education was associated with a gain of 0.04 standard deviations in reading and 0.11 standard deviations in mathematics. Unfortunately, these gains are so small that children are not closing the gap between their academic performance and the performance of their higher achieving classmates. This lack of improvement has the further negative effect of keeping students in special education for lengthy periods of time.

This increase in the identification of LD without concomitant improvement in academic achievement among school-age students invites several timely questions. What explains the increase? Is the increase due to improved identification practices? Or is the definition of LD too general and ambiguous to identify younger children at risk for learning failure before they fail? Are some students identified as LD having difficulties learning primarily because of poor instruction? Put another way, does the education profession create instructional casualties by inadequately preparing both general education and special education teachers to address learning differences

among children? Once identified, why are special education services not effective in improving learning? Most importantly, can answers to these questions lead to improvements in how LD is defined, how it is identified, how it is prevented, and how children who appear initially refractory to early interventions can be taught with effective remedial strategies?

### **Explanations for Increases in Identification of LD Derived From Converging Research Findings**

I will propose today, on the basis of strong converging scientific evidence, that the increase in the incidence of LD is related to four factors. First, the vague definition of LD currently in Federal law and the use of invalid eligibility criteria (e.g., IQ-achievement discrepancies) invite variability in identification procedures. For instance, LD identification processes, particularly with regard to how test scores and exclusionary criteria are used, differ across states and even across local school districts within states. Thus, while objective criteria can be established, the identification of students with LD is a highly subjective process at the level of the interdisciplinary team. Here there is considerable variation in how common exclusions for economic, cultural, and linguistic diversity and adequate opportunity to learn are interpreted. This problem is magnified when the variations in criteria are considered. In some states, and even in some local school districts, different diagnostic criteria are used. For example, one state or local district may require a 22 point discrepancy between an IQ score and scores obtained on an achievement test, while another state or district requires more or fewer points, or does not require an IQ-achievement discrepancy calculation at all.

In the state of Connecticut, the prevalence rate of LD in Hartford is 17.4 percent. Hartford is a district serving a relatively poor population. New Haven is similar to Hartford in socioeconomic characteristics, but the prevalence of LD in New Haven is 12.9 percent, roughly three quarters of that in Hartford. On the other hand, Greenwich, one of the wealthiest districts in the state, has a prevalence rate of 16.2 percent while New Canaan, a district similar in socioeconomic characteristics to Greenwich, has a prevalence of LD of 9.5 percent. Hebron, another relatively wealthy community, identifies 7.2 percent of its students as LD. The highest prevalence of LD in Connecticut is found in Canaan, a largely white and working class district, where 23.8 percent of the students are identified as LD. It would be comforting if these differences in prevalence were primarily related to the presence of more effective instructional programs and practices in some districts, but that does not appear to be the case. Rather, the districts employ different standards for identification in an attempt to provide services to children not benefiting from regular education or to respond to parental concerns. And the vague exclusionary-based definition of LD allows these differences in identification practices to occur.

Second, and clearly related to increases in referral for assessment of LD, many teachers have not been prepared to provide differentiated instruction that responds to the different instructional needs that students bring to the classroom. Moreover, traditional approaches to reading instruction in the early grades have substantially

underestimated the variability among children in their preparation for learning to read. A significant number of general education teachers report that their training programs did not adequately prepare them to adequately assess learning needs and provide effective reading instruction on the basis of these assessments. This problem is especially acute for students with limited oral language and literacy experiences who arrive in the classroom behind in vocabulary development, print awareness abilities, and phonological abilities. Many of these youngsters have difficulties reading, not because they are LD, but because they are initially behind and did not receive the classroom instruction that can build the necessary foundational language and early reading skills. When teachers feel they are not successful with their students they tend to refer them for specialized services. While some children require these services, many only require enhanced classroom instruction from a well-prepared classroom teacher. Well prepared is the operative term here and when teachers do not receive the benefits of robust training, many children entering their classrooms who require instruction to address these learning needs leave the classrooms as instructional casualties and/or referrals to special education. To serve these students, schools often simply ignore the exclusionary criteria in Federal regulations.

Third, the increase in the identification of students with LD, particularly at the older age ranges, reflects the fact that the remediation of learning difficulties is rarely completely effective after the second grade, particularly as children are commonly served in special education programs in schools. This well-documented finding is primarily due to students falling further and further behind in their academic progress because of reading difficulties and losing motivation to succeed rather than due to limitations in brain plasticity or the closing of "critical periods" in which learning can occur. Consider, during the time that students have been allowed to remain poor readers, they have missed out on an enormous amount of text exposure and reading practice compared to average readers. By one estimate, the number of words read by a middle-school student who is a good reader approaches one million compared with 100,000 for a poor reader. This difference places poor readers at a significant disadvantage with respect to vocabulary development, acquisition of a repertoire of sight words, and the development of reading fluency. In short, reading becomes an onerous chore that is frequently avoided.

Fourth, the assessment and identification practices employed today under the existing definition of LD and the accompanying requirements of IDEA work directly against identifying children with LD before the third grade. Specifically, as Dr. Pasternack explained, the over reliance on the use of the IQ-achievement discrepancy criterion for the identification of LD means that a child must fail or fall below a predicted level of performance before they are eligible for special education services. Because achievement failure sufficient to produce a discrepancy from IQ cannot be reliably measured until a child reaches approximately nine years of age, the use of the IQ-achievement discrepancy literally constitutes a "wait to fail" model. Thus the youngster has suffered the academic and emotional strains of failure for two or three years or even more before potentially effective specialized

instruction can be brought to bear. Thus, it is not surprising that our NICHD longitudinal data show clearly that over 70% of children who are poor readers at age nine or older continue to have reading difficulties into adulthood.

In summary, the increases in the incidence of LD over the past quarter century are certainly not due to improved identification practices. Rather, the increases in identification, particularly within the older age ranges, reflect the fact that Federal policy as instantiated in IDEA and resistance to change allow ineffective, inaccurate, and invalid identification practices to continue placing highly vulnerable children at unconscionable further risk.

### **Explanations for Why Special Education Services Are Not Effective in Improving Learning and Achievement**

There are two major reasons why traditional models of special education service provision have proven ineffective. First, the standard "specialized" instruction provided through typical remediation models is frequently too little, too general, and too unsystematic. For example, Sharon Vaughn and her colleagues with support from OSEP studied children with LD in reading who were served for an entire year in public elementary school special education resource rooms. They found that the "special education" was characterized primarily by whole group reading instruction provided to large groups of children (5 to 19) who also varied widely in grade level (grades 3-5). Despite this variation, little individualized or differentiated instruction occurred. This results of this study converges with several other studies identifying the same ineffective practices. For example, in a study supported by NICHD, Barbara Foorman and colleagues found that even with professional development and the introduction of well regarded specialized reading programs, children identified as LD and enrolled in public school elementary resource rooms did not close the gap after a year of instruction. Foorman reported that the instruction was not sufficiently intensive, noting that the class size of 8- 12 per teacher was too large, and estimating that children only received about 6 months of instruction because of time missed moving across classes, field trips, and the like.

Second, and related to an issue discussed earlier, even if the instruction were of high quality, it may be too late to have maximal benefits given that students with LD placed in special education classrooms are already woefully far behind and less motivated to learn to read following one, two, or three years of failure. Joseph Torgesen and associates obtained truly remarkable results in just 8 weeks of two-hour daily lessons with students in Grades 3-5 who had severe LD in reading. But gains in fluency were not apparent, which he attributed to the student's lack of adequate exposure to text and subsequent lack of adequate sight word vocabulary. This problem is an experiential one that is hard to remedy when children can't access print until Grade 3.

### **It Does Not Have to Be This Way.**

The best mainstream scientific research supported by the NICHD and OSEP - - studies that reflect the consensus of experts in such fields as special education,

general education, child development, psychology and the neurosciences - indicates that most longstanding differences in defining and educating students with LD stem from inaccurate assumptions about the causes and characteristics of LD. Moreover, there is compelling and converging evidence from these fields that justify investments in early identification and prevention programs for children at risk for LD. This is nowhere more true than with LD in reading, which is by far the most common and troublesome of the different types of LD, constituting 80 to 90 percent of all students with LD. Fortunately reading disabilities are also the best understood and most effectively corrected learning difficulty if identified and addressed early. Reading disabilities are not the only form of LD- but it is the most prevalent- and even those children with LD in reading may have other LDs, ADHD, and other problems that may not be adequately addressed by a focus on reading. But for many children reading is the primary area of difficulty and even those with other difficulties benefit enormously from improvements in their reading.

There is simply no doubt that if children receive effective instruction early and intensively, they can make large gains in general academic achievement. Indeed, in early intervention and prevention studies supported by the NICHD and OSEP, early intervention with the lowest 20% in Kindergarten and Grade 1 reduced the percentage of students reading poorly to under six percent, and this was accomplished just with enhanced classroom reading instruction. When supplemental reading instruction was provided in small groups, the percentage of children failing to read decreased to fewer than two percent. And, as Assistant Secretary Pasternack pointed out, by reducing reading failure in the majority of students who would fail without proper early intervention, special education resources can now be deployed intensively and with greater provision to that two to six percent of the student population of struggling readers who did not respond to early intervention. These are the children who are rightfully considered LD in reading and for whom special education resources should be concentrated. And at present, it is these children for whom LD is a life long circumstance, and we must work intensively to identify interventions that help individuals compensate for their learning disability if early intervention and remediation are not effective.

We now have substantial scientific evidence that early intervention can greatly reduce the number of older children who are identified as LD in reading, the largest category of children identified for special education. Most of these children also struggle with math and writing, which also improves with early intervention. Without early identification and the provision of effective early intervention, children with LD in one or more of the academic domains defined in IDEA, as well as other students with reading difficulties, will require long-term, intensive and expensive special education programs, many of which continue to show meager results. Early intervention allows ineffective remedial programs to be replaced with effective prevention while providing older students who continue to need specialized services with highly informed and evidenced-based intensive instruction so they can return as quickly as possible to the educational mainstream. This should be the primary focus of special education for students with LD - the instruction of those children who

continue to suffer failure in reading, mathematics, and written language, and non-academic domains like problem solving and attention despite well-documented and systematic early instruction.

### **Recommendations**

There are few areas where the relationship of science and policy are more loosely linked than in the area of learning disabilities. In too many instances, policy-related issues have driven the scientific agenda relevant to LD. The situation should be reversed; scientific research should inform policies that address LD. But the production of clear, convergent scientific findings is only the first step. Effecting meaningful change in the lives of children and teachers requires that we not only have sound scientific findings, but that we understand how to formulate policies based on these findings to produce changes at the individual child level.

It is unlikely that the formulators of the original Education for All Handicapped Children Act would conceive that the largest number of students served under the law would be children in a relatively new disability category. And while it is clear that we now have overwhelming evidence that changes are needed in the LD identification and service provision areas, we must expect and anticipate unintended consequences that may follow any changes in current legislative language. I realize that even the best evidence-based recommendations will not be utilized and sustained in practice unless careful thought is given to identifying the conditions that will increase the probability of their successful implementation.

These conditions include our ability to (1) ensure that all recommendations have been sufficiently tested to acknowledge clearly their strengths and weaknesses and evaluate their specific impact on the children and adults to be served; (2) ensure that all programs that are implemented on the basis of policy are based upon the highest quality of scientific evidence and are continuously evaluated for the efficacy; (3) ensure that all policies and programs are held to the highest levels of accountability and linked explicitly to documented improvements in student achievement; (4) anticipate the effects of changes in policies and practices on federal, state, and local communities and address them effectively; (5) take into account barriers to change in public school policy and practice; (6) articulate specific areas where capacity must be developed to ensure successful implementation; (7) develop and implement explicit transition models to ensure that recommendations to change identification and eligibility criteria are piloted to scale and accompanied by data on the validity, educational outcomes, and costs associated with the changes; and (8) devote necessary resources to technical assistance and dissemination.

Within the context of these general recommendations, the following specific recommendations are provided:

(1) Replace the muddled exclusionary definition of LD with evidence-based inclusionary definitions through a well-articulated transition process to evaluate validity, cost and effects on student achievement and other outcomes. These definitions must specify and distinguish disabilities in reading, mathematics, written

expression, and oral language. The extensive evaluations designed to fit the child into one of the 13 categories of IDEA can be simplified by focusing on assessments of achievement that are directly related to instruction.

(2) Even in a transition phase, there is no need for IQ tests for the identification of children with LD. and the use of the IQ-achievement discrepancy criterion should be discontinued. Validated alternatives exist that have been in place in whole states and districts. Their implementation should be evaluated through a systematic transition process. For example, in most cases, particularly in reading, student underachievement can be predicted on the basis of performance on measures assessing skills directly related to the academic domain in question. In addition, underachievement can be documented by direct comparisons of students' age and grade with their academic functioning in oral language, reading, writing, and mathematics. The key is a broad assessment of achievement directly related to instruction.

(3) Include a student's response to well-designed and well-implemented early intervention as part of the identification process for LD. There is a pressing need for early, intensive, empirically based interventions to be made easily available to children through general education.

No doubt, children who do not benefit from these interventions will require more intensive remediation programs as well as educational accommodations as they proceed through school. In essence, the identification of LD would be reserved for children whose reading and other academic deficits appear to be severe and intractable. This would allow them to receive more comprehensive and intensive help earlier and with greater focus. In turn, this would prompt researchers to more intensive study to determine how the environment, the brain, and heredity interact to impede response to early instruction. This is by no means an attempt to "write off" children who do not respond to aggressive early instruction. To the contrary, it is an attempt to maximize their learning potential through scientifically sound and effective practices.

(4) Related to number 3, ensure that the development and implementation of early identification, prevention and early intervention programs are the joint responsibility of both regular and special education.

(5) Related to number 4, acknowledge the limitations of current teacher preparation programs and models for both general and special educators. The statement that many children are identified, as LD are actually "instructional casualties" is unfortunately all too often accurate. Almost all children can learn to read, for example, if taught appropriately, but many miss out on the help they need because teachers are not adequately prepared. Both special and general educators must be prepared on the basis of the converging scientific evidence of how children learn, why some children have difficulties, and how the most effective instructional approaches can be identified and implemented. All educators should share a common

language about these fundamental principles and hold a common dedication and ability to address the needs of students who arrive in their classrooms from highly diverse backgrounds and a range of initial abilities. To do this, teachers must be prepared to identify the characteristics of high quality research and to be able to distinguish between research that is trustworthy and that which is weak and ill informed.

(6) Encourage alternative models for teacher preparation and continuing professional development. It is unlikely that colleges of education will change their current preparation practices in the near future. What is clear is that teachers must be provided the critical academic content, pedagogical principles, and knowledge of learner characteristics that they need in order to impart evidence-based systematic and informed instruction to their students.

### **An Example of Translating Scientific Research into Practice**

Included in my testimony are additional materials that describe and document how the recommendations noted above can be implemented with success in real schools and real classrooms. I offer for the record a description of how the effectiveness of reading instruction was significantly improved and led to substantial improvements in student reading achievement. The paper that provides this information was written by Ray King, principal of the Hartsfield Elementary School in Tallahassee, Florida and by Dr. Joseph Torgesen, one of the leading reading researchers in the country and an NICHD researcher who is also working closely with OSEP. The specific scientific data relevant to this report have been published in several refereed journals. I would like to draw your attention to the figure that denotes changes in the end-of-year reading performance of children as a function of the implementation of scientifically based early intervention as I provide an overview of the study.

Over a 5-year period, Hartsfield Elementary School worked to implement a comprehensive reading curriculum in kindergarten through grade 3 and to establish significant amounts of preventive reading instruction for children who were performing significantly below grade level in the first and second grade. The school serves a population of children who are about 65% minority and 60% of the students are eligible for free or reduced lunch support. In the first year of the program, the new classroom reading instruction was only partially implemented in all primary grade classrooms. The preventive instruction was phased in gradually beginning in the second year of the project as new resources for providing the instruction were identified. The results for reading skills are provided in the figure that I have provided you. The test used to measure reading skills was a nationally standardized measure of word reading abilities, and individuals other than the children's teachers administered the test at the end of each year to the students.

The figure shows the percentage of children who ended first and second grade performing below the 25th percentile, and it also describes the change in average percentile for all children. As you can see in the figure, during the 5-year implementation period, the percentage of children performing below the 25th

percentile at the end of the first grade dropped from 31.8 percent to 3.7 percent. Likewise, during the 5-year implementation period, the percentage of children performing below the 25th percentile at the end of the second grade was only 2.4 percent. In terms of long-term impact of early intervention at Hartsfield Elementary, during the same period of time, the school achieved the largest growth of any of the 20 elementary schools in the district on the state-administered reading test given at the end of the third grade. Moreover, during the project period, the average Metropolitan Reading Achievement Test scores for the entire third grade increased from the 49th percentile to the 73rd percentile because of the reading improvement observed among the school's lowest performing students. Other low performing schools show similar improvements with the adoption of professional development programs that focus on scientifically- based reading instruction, such as the Pueblo district in Colorado. In the Elk Grove district in California, the reduction in referrals to special education from about 13% to about 9% is widely attributed to implementation of scientifically- based reading instruction programs.

I would also like to draw your attention to the figure that you also have that depicts what occurs in a youngster's brain when that child learns to read through the provision of scientifically-based reading instruction provided by well trained teachers. You will note on the top right side of the figure a left hemisphere of an at risk reader participating in an Interagency Educational research Initiative (IERI) study directed by Dr. Jack Fletcher at the University of Texas Health Science Center in Houston. Dr. Fletcher and his associates were able to identify this child at the end of kindergarten as at risk for reading failure early based on the Texas Primary Reading Inventory, which is used in over 90% of school districts in Texas. They then provided intensive and comprehensive small group reading instruction in Grade 1. At the end of Grade 1, this child, like all but 11 of the approximately 150 children identified as at- risk, is now reading at the average level with good reading fluency and comprehension. Her improved reading abilities are mirrored in increases in brain activity in those left hemisphere neural systems established by NICHD research as responsible for reading. From this picture, one can see that effective early instruction not only helps a child learn to read but in doing so changes the brain to normalized levels of activation as well. Even teachers perform successful brain surgery. All good instruction is brain- based!

In closing, we have learned a great deal over the past twenty-five years about how children learn to read and why some of those youngsters experience difficulties. We have learned a tremendous amount about reading development and reading disabilities and are confident that we can ensure that all but 2 to 6 percent of children can become successful readers under the proper assessment and instructional conditions. While we have a great deal of work to do to enable ALL children to learn to read, the prospects for reducing reading failure in the United States is encouraging.

What is not encouraging is that many in the education and policy communities continue to hold with tenacity to failed convictions. The real tragedy is that conceptualizations of LD have not changed over the past 30 years despite the

completion of significant scientific research conducted over the past 15 years by the NICHD and OSEP. What we now know from research must be translated into practice and implemented with care. No Child Left Behind (NCLB) is a great start. The reauthorization of IDEA must be integrated in a seamless fashion with NCLB and IDEA must require that we implement what we have learned from research. Children and their teachers and parents deserve no less.

Thank you Mr. Chairman and I would be happy to answer any questions that you may have.