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ABSTRACT

This paper reviews research on the classification of students with learning disability (LD). It first examines the evolution of LD definitions and the evidence for three components of LD classification: discrepancy, heterogeneity, and exclusion. It suggests that classification hypotheses involving discrepancy and exclusion have weak validity and often represent inaccurate and outdated assumptions about LD. The paper next reviews some alternative classification hypotheses and argues that inclusionary definitions that specify attributes of different forms of LD are more desirable than exclusionary definitions and that inclusionary definitions permit identification procedures that are treatment oriented and focus on prevention. Finally, the paper discusses some difficult issues in relating policy and practice with research, essential for improved identification and treatment of LD. The paper urges the development of a consensus process to devise a new classification of LD with inclusionary definitions, the possibility of prevention, the use of response to intervention as a major factor in evaluating the disability, and an emphasis on results and outcomes. (DB)

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# CLASSIFICATION OF LEARNING DISABILITIES: AN EVIDENCE-BASED EVALUATION


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## EXECUTIVE SUMMARY

### Introduction

Classification is fundamental to the scientific enterprise and all classifications are hypotheses that need to be empirically evaluated. The keys are to recognize the classification, to make it explicit, and to evaluate its reliability and validity. To illustrate, the classification of learning disabilities (LD) occurs in identifying children as LD or typically achieving; as LD versus mentally deficient; and, within LD, as reading versus math impaired.

LD is traditionally identified as "unexpected" underachievement and is distinguished from expected underachievement (Kavale & Forness, 2000). The nature and causes of LD must become "expected" in order for assessments and interventions to be developed. In the 1960s, there was little research that evaluated the LD classifications; the existing common assumptions about, classifications of, and identification procedures for LD have not changed significantly in response to evolving research since their adoption in federal and nonfederal classifications.

This paper reviews research on the classifications of LD in three sections. The first reviews the evolution of LD definitions and the evidence for three components of LD

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classification: discrepancy, heterogeneity, and exclusion. The paper shows that classification hypotheses involving discrepancy and exclusion have at best weak validity and often represent inaccurate and outdated assumptions about LD. There is evidence for heterogeneity of LD.

The second section reviews some alternative classification hypotheses, with particular attention to their viability for improving the treatment of children identified with LD. The authors argue that underachievement LD is expected, reflecting the accumulation of research over the past 30 years; that inclusionary definitions that specify attributes of different forms of LD are more desirable than exclusionary definitions; and that inclusionary definitions permit identification procedures that are treatment oriented and focus on prevention.

The third section discusses some difficult issues in relating policy and practice with research, essential for improved identification and treatment of LD. It calls for a process to yield research-based inclusionary definitions of LD that are designed to enhance results.

## Findings

### *The Concept of IQ-Discrepancy*

The concept of unexpected underachievement and its attribution to neurobiological factors has been reported in the academic literature since the turn of the century. In the early 1960s, the term *learning disabilities* was coined. The term gained rapid acceptance because until LD was established as a special education category, children with LD were excluded from services. Their learning characteristics did not correspond to existing categories. An evolution of definitions for LD in federal legislation reflects the hypotheses of IQ discrepancy, heterogeneity, and exclusion. The IQ-achievement discrepancy criterion is by far the most controversial component of the federal definition of LD. The question is how much children defined as IQ-discrepant and low achieving (LA) differ and whether the differences are meaningful for research and practice. Children with LD who are IQ-discrepant are thought to

differ from non-IQ–discrepant low achievers (LA) on several dimensions, and the hypothesis received support from the Isle of Wight studies. However, more recent studies of this classification have provided mixed evidence for its validity.

The paper explores these findings through a review of studies of reading disability that examine a variety of related components – prognosis, response to intervention, neurobiological factors, behavior, achievement, and cognitive ability domains. The authors conclude that studies of reading disability do not support strongly the validity of LD classifications based on IQ-discrepancy. Data on children with math disability and speech and language disorders also do not support the validity of discrepancy-based classifications. Psychometric issues make it unlikely that any form of discrepancy definition for any learning disability category will have utility. Tests of this hypothesis through simulated data and actual data show that discrepancy definitions are not stable over time or across definitions. Altogether, the evidence suggests that the IQ-discrepancy classification hypotheses must be questioned, even though definitions of LD based on discrepancies are valid. Children identified with such definitions are disabled, need to be identified, and respond to appropriate educational interventions. Children who meet discrepancy definitions just do not show major differences relative to children whose poor achievement is consistent with IQ.

***Heterogeneity Hypothesis***

In federal and non-federal definitions, LD is represented as a category composed of disabilities in seven academic domains. Although the inclusion of these domains ensures that LD accounts for a range of learning difficulties, the practice implies that learning problems can be represented by a single definition. Thus, many studies simply define groups of children as "learning disabled" despite evidence that LD in different academic domains varies. Considerable evidence supports distinct forms of LD in reading and mathematics and the

differentiation of LD from oral language disorders. Definitions of domain-specific disabilities would allow the separate identification of children with reading, mathematics, writing, and oral language disabilities. The definitions could be used to determine which students are eligible for special education services and to recruit participants in research studies to better understand each of these areas.

Co-occurrence of the specific learning problems and heterogeneity within and across domains make it difficult to disentangle these subgroups of LD, but the heterogeneity hypothesis has validity. Disorders are commonly overlapping, and a child may have problems in more than one area of academic functioning. Identification practices should focus on identifying the areas of disability. To do this, refinement of the number of disorders in the LD category is needed.

### *Exclusion Hypothesis*

Most definitions of LD include an exclusion clause, which simply states that LD is not the result of other conditions that can impede learning. These other conditions include mental deficiency; sensory disorders; emotional disturbance; cultural, social, or economic conditions; and inadequate instructional opportunities. Most children identified as LD have been diagnosed on the basis of what they are not, rather than what they are. This emphasis on what they are not makes it impossible to link identification to assessment and intervention. For example, the federal definition suggests that reading disability (RD) be assessed with IQ and achievement tests; it does not specify the domains of reading and ignores the variation in components of reading that may represent differential treatment emphases.

***Exclusion on the basis of another disorder.*** Although it is reasonable to exclude children with mental deficiency and sensory disorders from classifications of LD, other exclusions are more difficult to justify. For example, early failure to achieve may be causally related to, and often precede, the development of behavioral problems. Interventions that

enhance academic achievement could prevent behavioral difficulties. Many children with emotional and behavioral problems have a comorbid learning disability.

***Exclusions based on social, economic, and cultural disadvantage***. These exclusions are based on the presumption that for children with LD, constitutional factors are more relevant than environmental factors. Yet a variety of factors related to the literacy environment in which a child develops are related to the acquisition of academic skills. These types of factors have an impact on oral language development. It is widely believed that these types of differences in language development have some (unspecified) effect on brain development, and they are certainly related to the development of proficiency in academic skills. A variety of language skills are at risk, including those related to the development of word recognition and reading comprehension skills. Environmental factors influence the development of oral language skills that are known to affect beginning (and later) reading skills. Interventions that address the early development of these skills seem to promote success in reading. Thus, the mechanisms and practices that promote reading success in advantaged populations appear to be similar to those that promote either reading success or failure in disadvantaged populations.

These exclusion practices have more to do with how children are served than with evidence that characteristics of reading failure are different in these two groups. Exclusion is a policy decision that represents a desire to clearly separate funds dedicated to special education and compensatory education. This separation creates a two-tier delivery system for students with similar reading problems. It is reasonable to exclude children from the learning disability category for policy purposes if they are served through other modalities (e.g., compensatory education). These policies should not drive our concept of LD nor should they imply that the nature of the learning problems, and most important, treatment needs, are significantly different.

***Exclusion based on inadequate instruction***. Most definitions of LD exclude children for learning problems caused by inadequate instruction. This criterion is sometimes not applied, and for good reason, because children who do not receive adequate instruction develop learning problems. Some interpret the exclusion to indicate that children who profit from instruction do not have a biologically based disorder. However, functional imaging studies suggest that this is not the case and that instruction is necessary to establish the neural networks that support reading. Why should the complex identification criteria and expensive due process procedures of special education be used before an attempt is made to provide a powerful intervention early in the child's development? Why shouldn't this be part of the special education process? However, although a child's failure to respond to appropriate instruction is probably a very strong indication of a disability, the cognitive problems associated with his or her LD parallel those exhibited by children who do respond to inadequate instruction.

***The role of constitutional factors.*** Classification research shows little evidence supporting exclusions based on emotional disturbance; social, cultural, and economic disadvantage; and inadequate instruction. Related to this hypothesis, however, is the notion that "unexpected" LD is due to "constitutional" factors that are intrinsic to the child. Neurobiological factors do not represent formal classification hypotheses, but they do represent components that can be tested for validity purposes. If children with "unexpected" underachievement differ from children in whom achievement is expected on constitutional factors, then this might support the hypothesis that unexpected underachievement should be differentiated from expected underachievement.

The field of LD was founded on the assumption that neurobiological factors were the basis of learning disabilities, reflecting its conceptual origins in the notion of organically based

behavior disorders. Over the past two decades, some evidence, varying widely in methodological quality, has been obtained from investigations designed to identify, more directly, the neurological basis for LD, and particularly RD. It is important to point out, however, that different brain–reading behavior correlations are observed among adults and children with RD irrespective of whether they have low average, average, or above average intelligence, or whether they have been identified as LD on the basis of current definitions. Current interpretations of the role of constitutional factors show reciprocal relations with the environment, such that environmental factors (e.g., instruction) must be in place to develop the neural networks that support academic skills. Even genetic studies of reading disability show that only about 50 percent of the variability in reading skills can be explained by genetic factors – the remainder is environmental. Learning disabilities represent interplays of constitutional and environmental factors that are not yet well understood.

***Alternative Classifications of LD***

The authors suggest that alternative classifications of LD must incorporate inclusive definitions of LD. The classification should be oriented to results and less so to compliance and must ultimately help students master academic skills essential to their capacity to function independently and effectively. For example, an inclusionary definition of RD that facilitates intervention specifies that a child is dyslexic who has 1) problems decoding single words in isolation and 2) difficulties with phonological processing. These constructs are easily measured, and the definition is directly linked to intervention, identifies dyslexia, and also permits the identification of children who do not respond to preventative interventions and who may need different forms of remediation. The key is to have a classification that signals when a child has (or is at risk for) a form of LD and that recognizes that the child may have other academic and behavioral difficulties.

Thus, we would move the concept of LD should be changed from a disorder that is unexpected because of discrepancies between ability potential and achievement to one in which underachievement is expected because of impairment of key cognitive processes. These processes are measurable and can be directly linked to intervention. To achieve this goal, the authors call for development of a consensus process to devise a new classification of LD with the best possible inclusionary definitions, the possibility of prevention, use of response to intervention as a major factor in evaluating the disability, and an emphasis on results and outcomes, not just compliance.

## Conclusion

The importance of approaching classifications as a hypothesis can be seen by simply asking how children who 1) have an IQ-discrepancy, 2) have problems in reading, 3) have processing difficulties, and 4) do not meet any of the exclusionary criteria could possibly be meaningfully different, or have different instructional needs than, a child with characteristics 1-3, but who meets an exclusionary criterion and is therefore not defined as LD. Current definitions of LD are primarily exclusionary in design, are categorical rather than dimensional, are ambiguous, and have little capacity to guide and inform instruction. Changes and refinements in the classification and resulting definition of LD should be treatment oriented and should accompany efforts to improve teacher education and to develop and implement early identification, prevention, and early intervention programs.

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