

## LEARNING DISABILITIES AT THE DAWN OF THE XXI CENTURY

*[Las dificultades específicas del aprendizaje en el albor del siglo XXI]*

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### Abstract

The purpose of this article is to inform to the reader the current debate on learning disabilities area. The language barrier imposed by the scientific literature in English makes professionals and college to miss the exciting progress on this diagnostic category so controversial from its formal beginning. We first analyze the definitions of specific learning disabilities that have been in force until the first decade of this century, then make the new definitions formulated to now and discuss characteristics of the history of definitions in this field. We conclude with the demands that we face because of the new definitions.

### Keywords

Learning disabilities, Special education, Reading instruction, Mathematics instruction, Educational politics.

### Resumen

El objetivo de este trabajo es acercar al lector la actualidad del debate sobre las *dificultades específicas de aprendizaje*. La barrera que impone la literatura científica en inglés hace que profesionales y estudiantes universitarios se pierdan los apasionantes avances sobre esta categoría diagnóstica que tan polémica trayectoria ha tenido desde su nacimiento formal. Presentamos las definiciones de las dificultades de aprendizaje que han estado vigentes hasta la primera década del siglo XXI, las nuevas definiciones y discutimos dos características de la historia de las definiciones en este campo. Concluimos con las exigencias que plantean las nuevas formulaciones.

### Descriptoros

Dificultades específicas de aprendizaje, Educación especial, Enseñanza de la lectura, Enseñanza de las matemáticas, Política educativa.

Reading is a complex skill. In order to learn to read, good instruction, a combination of attention, memory, linguistic and reasoning processes, and a lot of practice is required. Like other complex skills that are the result of the interaction between development and learning, there are large individual differences in reading performance. These individual differences have become increasingly visible as literacy has become more universal. In the 19<sup>th</sup> century, when only a minority of privi-

leged males were taught to read and write, generally with private tutors, there was less variability. The differences that did exist were less evident than those that have come to be as millions of children are taught to read in groups, led by one teacher.

Today, in Latin America and Spain, literacy reaches a large part of the school-age population. When reading in these countries is taught in Spanish (not forgetting other official

languages like Guaraní, Catalán, Euskera and Gallego, and non-official indigenous languages like Quechua, Maya, Mapudungun and Rapa nui, among others), a relatively transparent or superficial orthography is being used. For example, in the sense of reading, we convert a grapheme (a letter or set of letters, like “b”, “ch”, to which a phoneme corresponds) into a phoneme (the smallest unit of sound that can change the meaning of a word, like /s/ in “sal” and /k/ in “cal”). However, the Spanish orthography is not as transparent in the case of writing, as there are various graphemes for the same phoneme. In Spanish, we can read all of the words correctly (without being able to write them) without knowing their meaning or ever having heard them before. Thus, we have an orthography that is easier to learn in the case of reading than other more opaque or deeper alphabetic orthographies like English (see Seymour, Aro, & Erskine, 2003 for a study comparing European languages) or other writing systems, like Chinese, with a large number of symbols (see Ho, 2010). Therefore, unless various factors coincide to impede it, the majority of children are able to learn how to read over the course of one year of formal education, which in Spain is usually the first year of primary school. We use “learning to read” to refer to the (incredible) process that a beginning reader goes through when he or she identifies the graphemes, finds their corresponding phonemes, and puts these phonemes together to pronounce a word that he or she will recognize if it coincides with a word stored in his or her auditory memory (see Alegría, 2006 for an excellent explanation in Spanish of what it means to learn to read). It involves what one of the most successful cognitive models of visual word recognition (Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001; Jackson, & Coltheart, 2001) calls the *construction of the phonological route*, which, with practice, ends up producing the *lexical route*. Three or four more years will be necessary in order to read fluently (that is, with good accuracy, speed and expression), and up to seven or eight more to understand written texts with

the same level of comprehension as those that are listened to (Sticht, Beck, Hauke, Kleiman, & James, 1974).

Unfortunately, not all children learn to read and write successfully. Children who read with much less accuracy, speed, or both accuracy and speed, than expected at their grade level and age, without any other apparent disorders to explain this specific disability, enter into one of the least understood and most highly debated categories of special education, commonly called “*learning disabilities*” in Spain. This general term covers children who, due to a linguistic deficiency, do not manage to read, write, or do mathematical calculations.

The purpose of this study is to bring the reader up to date on the current debate about learning disabilities. The linguistic barrier imposed by the scientific literature in English causes education professionals and university students to miss the exciting advances made in this diagnostic category, whose trajectory has been so controversial since its formal beginnings in the early 1960s. In the first section, we present the definitions of learning disabilities that have been used or are still in use in the first decade of the 21<sup>st</sup> century. In the second section, we present the new definitions formulated so far. In the third section, we refer to two characteristics of the history of the definitions in this field, and we conclude by describing the demands proposed by the new definitions.

### **Definitions of learning disabilities that are becoming extinct**

Between the years 1960 and 2000, there were numerous definitions of learning disabilities, along with a large number of terms. We begin with a brief reference to the most widely-used terms in this area: specific learning disability, reading learning disabilities, developmental dyslexia, dyslexia, learning disorder and reading disorder. In such limited space, it is not possible to say much about whether these terms have meant the same thing over time and for everyone. We ask the

reader that, at the risk of being imprecise but flexible, they be regarded as synonyms. They have all helped various professionals (teachers, doctors, psychologists) designate children who did not learn to read at the expected level for their grade or age, without showing other apparent disabilities. The term *dyslexia* also serves to designate adolescents and adults who, having learned to read previously, have partially or totally lost this skill as a result of brain damage. We will use the same terms employed in the sources cited; when we do not refer to any particular source, we will use the term *specific learning disabilities* (LD). Our choice intends to support the term used in the university curriculum in Spain through the core material *Learning disabilities and Psycho-educational intervention* for a degree in Educational Psychology (Royal decree 916/1992). Additionally, for the first time, it is used in the Spanish Organic Education Law (2006), when in article 71, title II on equity in education, it mentions *specific learning disabilities* (p. 17179). In Spain the noun *difficulty* was used instead of *deficiency* or *disability*, and the preposition *of* rather than *in* (with the exception of Miranda, 1986). In the United States, when Spanish is used for this category, the expression usually employed is *specific learning deficiency*.

Another necessary clarification that should be made is related to why we talk indiscriminately about *specific learning disabilities* and *reading learning disabilities*, or why we identify specific learning disabilities with reading problems and ignore difficulties shown in writing and mathematics. The main reason is that the definition of *specific learning disabilities* implies the existence of a language-based problem. Therefore, 80 to 90% of children with specific learning disabilities only have trouble reading (U.S. Department of Education, 2006), and the research in this area has mainly dealt with the skill of reading. This identification also has a historic root that we do not explore here. In fact, there is already a specific definition of reading learning disabilities that attributes the problem to the

phonological component of language (Lyon, Shaywitz, & Shaywitz, 2003). Someday, the general term may disappear, leaving only the specific terms. We know today, for example, that mathematics learning disabilities, that is, the specific learning difficulties that manifest themselves as problems in learning mathematical calculation, do not always have, if they ever do, a linguistic origin. Given that there is a large amount of research on the cognitive characteristics of mathematics learning disabilities, we will not deal with this question here.

Of the many definitions of LD, we will focus on two: the one from the North American legislation and the one from the diagnostic and statistical manual (DSM, *diagnostic and statistical manual*) of the American Psychiatric Association. They have been decisive in professional practice and in research in North America, the leading country in this field. In the case of the DSM definition, it is a reference for professionals in countries like Spain that do not have laws or organizations to establish their own definitions.

The definition from the first law on special education financing in the United States, *Public Law 94-142, Education of All Handicapped Children Act of 1975*, opened the doors of American schools to people between 3 and 21 years of age with disabilities, thus giving official status to the category of LD by establishing the financing of direct services for these children. Public Law 94-142, which was maintained with hardly any changes until the later law called the *Individual Disabilities Education Act of 1997* (IDEA; see Torgesen, 2004), reads:

*The term 'children with specific learning disabilities' means those children who have a disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such disorders include conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such term does not in-*

clude children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or environmental, cultural, or economic disadvantage.

This definition did not vary much from the definition agreed on in 1968 by the *National Advisory Committee on Handicapped Children*, sponsored by one of the founders of the field of LD, Professor Samuel Kirk.

This law did not include criteria to identify, in practice, which children had an LD. Therefore, the U.S. Department of Education, in the regulations made after the law in 1997, first added a mathematical formula which it later retracted due to the criticism it received, and then the much debated criteria of and the severe discrepancy between the Intelligence Quotient (IQ, from here on) and performance in one of the domains specified by the law (see Cunningham, 2007). Multidisciplinary teams in North American schools could identify LD if:

(a) ... (1) *The child does not achieve commensurate to his or her age and ability levels in one or more of the areas listed in paragraph (a)(2) of this section, when provided with learning experiences appropriate for the child's age and ability levels; and*

(2) *The team finds that a child has a severe discrepancy between achievement and intellectual ability in one or more of the following areas: (i) Oral expression; (ii) Listening comprehension; (iii) Written expression; (iv) Basic reading skill; (v) Reading comprehension; (vi) Mathematics calculation; (vii) Mathematics reasoning.*

(b) *The team may not identify a child as having a specific learning disability if the severe discrepancy between ability and achievement is primarily the result of: (1) A visual, hearing or motor handicap; (2) Mental retardation; (3) Emotional disturbance; or (4) Environmental, cultural, or economic disadvantage.*

The definition from the fourth edition of the DSM (DSM-IV) states:

*Learning disorders are diagnosed when the individual's achievement on individually administered, standardized tests in reading, mathematics, or written expression is substantially below that expected for age, schooling, and level of intelligence. The learning problems significantly interfere with academic achievement or activities of daily living that require reading, mathematical, or writing skills. A variety of statistical approaches can be used to establish that a discrepancy is significant. Substantially below is usually defined as a discrepancy of more than 2 standard deviations between achievement and IQ. A smaller discrepancy between achievement and IQ (i.e., between 1 and 2 standard deviations) is sometimes used, especially in cases where an individual's performance on an IQ test may have been compromised by an associated disorder in cognitive processing, a comorbid mental disorder or general medical condition, or the individual's ethnic or cultural background. If a sensory deficit is present, the learning difficulties must be in excess of those usually associated with the deficit. Learning Disorders may persist into adulthood. (APA, 1994, pp. 48-49).*

The DSM-IV includes four disorders in its section on *learning disorders*: reading, mathematics, written expression and non-specified disorders. When dealing specifically with the reading disorder, it adds that the performance on reading accuracy, speed or comprehension is substantially below that expected given the individual's chronological age, measured intelligence and age-appropriate education (p. 50).

These and other definitions not reviewed here include common criteria:

(a) the discrepancy between IQ and academic achievement that we describe below;

(b) the heterogeneity or academic domains in which difficulties can appear (the North American law includes seven; the DSM-IV only includes three); and

(c) the reasons for exclusion from diagnosis, such as mental retardation, sensory impairment, socio-cultural disadvantage (the object of compensatory education and non-special education) or inadequate teaching. This last factor has received much criticism because, as neuro-imaging studies have shown, teaching

is necessary to create the neuronal networks that support reading (Fletcher et al., 2002). These three criteria focus the majority of the criticisms around the definition and identification of the LD. We do not think it is necessary to address these aspects, which have received a lot of attention in the Spanish literature (Defior, 1996; García, 2001; Jiménez, 1999). We will only deal with the first one due to its importance in evaluating the current changes.

The discrepancy criterion was included in the original LD concept formulated by Kirk (1962). He found that it was necessary to separate children with low academic achievement due to mental delay from children with low academic achievement but normal intelligence. Inclusion has been an important criterion, as is the exclusion of children who did not show a severe discrepancy in spite of being poor readers. However, the process to determine what a severe discrepancy is was not operationalized, which produced great variability in how it was applied in North American state laws, in research, and in practice (Lyon, 2001). Some statistical methods for calculating it have been: the deviation with regard to the grade in school, expectation formulas based on the IQ as predictor of reading performance, comparisons of normalized standard scores, and regression equations (Evans, 1990).

In Spain, and possibly in Latin America, it has been impossible to use the most appropriate formulas for calculating the discrepancy, including the ones established in the DSM-IV. The reason is that we do not have reading (or math or writing) tests that offer normalized standard scores, nor valid tests to measure the change over time. This impoverished situation in educational diagnosis did not have to be, in this case, an obstacle to the identification of students with LDs, if we take into account the numerous criticisms of the discrepancy criterion, like the fact that IQ does not predict reading performance or have a one-directional relation with reading, because in the long-term reading influences IQ (see Kavale, 2002). These and other criticisms have a more

profound explanation, which we will not discuss, and which involves the poor reliability and validity of the test scores and the results of the statistical procedures used to find discrepancies between the IQ and reading ability (or writing or mathematics). Of greater interest to the reader are the consequences of the lack of reliability and validity of the discrepancy criterion. One consequence is that it delays the identification of children with real reading problems to such a degree that the intervention may be ineffective because it is applied too late (Lyon et al., 2001). For the discrepancy to be reliable, it has been estimated that it would be necessary to wait until third grade or 9 years of age; at the same time, longitudinal studies show that the majority of poor readers beyond second grade rarely become normal readers (e.g., Klingner, Vaughn, Hughes, Schumm, & Elbaum, 1998; Shaywitz et al., 1999). Another consequence is that there are errors in the identification of children who do not show a discrepancy, but do have real reading problems. Numerous meta-analyses show that the children with a discrepancy and those with low performance, that is, those who perform as expected according to their IQ, are hardly differentiated on measures of reading and phonological knowledge, but they are on vocabulary and syntax (Hoskyn & Swanson, 2000; Stuebing et al., 2002). The third criticism is that the discrepancy criterion sheds little light on how to approach intervention (see Vaughn, & Fuchs, 2003) and what the response to the intervention might be, as it hardly explains 1% of the variability (Stuebing, Barth, Molfese, Weiss, & Fletcher, 2009).

In response to these and other criticisms, the North American law was reformed, and the DSM definition will soon be rewritten.

### **The specific learning disabilities in the 2004 IDEA and the 2013 DSM-V**

At the dawn of the 21<sup>st</sup> century, we are witnessing important changes in the definitions and identification procedures of LDs offered by the sources reviewed in the previ-

ous section (North American legislation and DSM).

Regarding the North American legislation, in the first decade of the 21<sup>st</sup> century, under President Bush, Congress approved two laws on financing general education and special education: *Public Law 107-110*, or the *No Child Left Behind Act* (NCLB) of 2001, and *Public Law 108-446*, the *Individuals with Disabilities Education Improvement Act* (IDEA) of 2004, respectively. Both laws cover the intention to improve the academic performance of *all* students and change the culture of the North American schools, focusing on the results of the child, and not on the resources offered (Weishaar, 2008). In fact, they were preceded by four reports on special education, based on research on LDs and reading, where it was pointed out that the identification of children with LDs could be reduced with good teaching, and that many children placed in special education had not received an adequate general education (Fletcher, Coulter, Reschly, & Vaughn, 2004, pp. 306-307).

We will deal with the IDEA, which incorporates the definition of the disorder that concerns us here and applies the same innovations as the NCLB regarding children with LDs. In fact, the 2004 IDEA is a reformulation of the 1997 IDEA, in order to achieve its alignment with the principles of NCLB. IDEA legislates how North American states and public agencies must offer special education, interventions and other similar services to individuals from birth to the age of 21 who present one or more of the 13 handicaps mentioned in the law, including the *specific learning disability*. As we will see, the formal definition differs somewhat from the 1997 IDEA and the 1975 law on individuals with handicaps:

*IN GENERAL.- The term 'specific learning disability' means a disorder in 1 or more of the basic psychological processes involved in understanding or using language, spoken or written, which may manifest itself in the imperfect ability to*

*listen, think, speak, read, write, spell, or do mathematical calculations.*

*DISORDERS INCLUDED.- Such term includes conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia.*

*DISORDERS NOT INCLUDED.- Such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage (IDEA, 2004, pp. 2657-2658).*

The novelty of the 2004 IDEA consisted of the additional procedures established two years later by the North American Department of Education in the 2006 regulations for the identification of these students. They include three general criteria, which are:

- (1) Must not require the use of a severe discrepancy between intellectual ability and achievement for determining whether a child has a specific learning disability ...;*
- (2) Must permit the use of a process based on the child's response to scientific, research-based intervention; and*
- (3) May permit the use of other alternative research-based procedures for determining whether a child has a specific learning disability ... (p. 46786).*

Below are the specific criteria that the diagnostic group must use (now composed of the parents, classroom teacher and a professional qualified to make individual diagnoses) to determine the existence of an LD:

*"(a) [...] (1)*

*The child does not achieve adequately for the child's age or to meet State-approved grade-level standards in one or more of following areas, when provided with learning experiences and instruction appropriate for the child's age or State-approved grade-level standards: (i) Oral expression. (ii) Listening comprehension. (iii) Written expression. (iv) Basic reading skill (v) Reading fluency skills. (vi) Reading comprehension. (vii) Mathematics calculation. (viii) Mathematics problem solving.*

(2)(i) *The child does not make sufficient progress to meet age or State approved grade-level standards in one or more of the areas identified in paragraph (a)(1) of this section when using a process based on the child's response to scientific, research-based intervention; or*

(ii) *The child exhibits a pattern of strengths and weaknesses in performance, achievement, or both, relative to age, State-approved grade-level standards, or intellectual development, that is determined by the group to be relevant to the identification of a specific learning disability, using appropriate assessment, consistent with [...]; and*

(3) *The group determines that its findings under paragraphs (a)(1) and (2) of this section are not primarily the result of — (i) A visual, hearing, or motor disability; (ii) Mental retardation; (iii) Emotional disturbance; (iv) Cultural factors; (v) Environmental or economic disadvantage; or (vi) Limited English proficiency.*

(b) *To ensure that underachievement in a child suspected of having a specific learning disability is not due to lack of appropriate instruction in reading or math, the group must consider, as part of the evaluation described in [...]*—

(1) *Data that demonstrate that prior to, or as a part of, the referral process, the child was provided appropriate instruction in regular education settings, delivered by qualified personnel; and*

(2) *Data-based documentation of repeated assessments of achievement at reasonable intervals, reflecting formal assessment of student progress during instruction, which was provided to the child's parents.*

(c) *The public agency must promptly request parental consent to evaluate the child to determine if the child needs special education and related services, and must adhere to the timeframes described in [...], unless extended by mutual written agreement of the child's parents and a group of qualified professionals, as described in [...] (a)(1)—*

(1) *If, prior to a referral, a child has not made adequate progress after an appropriate period of time when provided instruction, as described in paragraphs (b)(1) and (b)(2) of this section; and*

(2) *Whenever a child is referred for an evaluation.*

(U.S. Department of Education, 2006, pp. 46786-46787).

Summarizing, the main novelty in the identification procedures is the substitution of

the *discrepancy criterion* by that of *response to intervention*. The heterogeneity criteria are maintained, although now with eight domains instead of seven, as reading fluency was added. The *causes for exclusion* are also maintained, although with more complex requirements to demonstrate that the suspicion of LD is not due to a lack of instruction. In this regard, some critics state that the delays in the attention to children with LD will continue due to the complexity of the current documentation (see Cunningham, 2007). Thus, in the process of identifying a student with LD, the schools should not require, although it is not prohibited, the use of the discrepancy between the IQ and reading skills or other domains, and they should permit, although it is not obligatory, the use of a process based on the child's response to a scientific evidence-based intervention. This procedure has been called the *response-to-intervention* approach, included for the first time in the NCLB law, and referring to the fact that the student who shows signs of having an LD would receive increasingly intense interventions.

Although there is some debate about how many levels are necessary in order to consider an intervention adequate, it is common to talk about three levels of intensity and six steps in the procedure to be followed (see e.g., Fuchs, 2007; Johnson, Mellard, Fuchs, & McKnight, 2006). *Level one*, called preventive intervention, involves the use of quality evidence-based instruction programs used with the entire class in what is considered general, not special, education. This level requires continuous monitoring using brief tests to identify those students with low achievement and a risk of developing an LD, with a follow-up done every 1 or 2 months on their response to the use of these general education programs. *Level two* should be used as soon as possible, and it includes reinforcement in a small group (1 to 5 children) offered by a specialist, tutor or special education teacher. At this level, programs and strategies are used that are designed to improve the

level one teaching offered to all the students. Although there is no consensus about how long the level two interventions should last, 9 to 12 weeks with continuous evaluation has been suggested. The end of this phase can lead to three decisions: (a) for the student to return to the general classroom, (b) for the student to receive a second round of level two instruction, (c) for those who have not improved at all at this level to go on to level three. *Level three* is synonymous with special education. At this level, the LD is diagnosed and, at the same time, the intervention is offered. The intervention, individual or in a small group, is adapted to the needs of the student and involves continuous monitoring. When improvements are observed that place the student at the expected level for his grade, he or she must return to level one. If he or she fails again in the general class, the student can return to level two and level three, proceeding in this way until the student can remain in level one. Only if the student does not respond positively to the series of interventions is he or she considered to be at risk of having an LD and possibly in need of special education services.

With regard to the second source, the definition from the DSM-IV will continue to be valid until the year 2012, but changes have already been proposed for the 5<sup>th</sup> edition, which will probably be published in 2013. The future DSM-V will use the term *learning disabilities* for the first time instead of *learning disorders* and, as in the 2004 IDEA, it proposes to eliminate the discrepancy between intellectual capacity and academic achievement as an identification criterion. It is too soon to know which other criteria will be included in the DSM-V definition.

### **Brief historical note about the specific learning disabilities**

It is beyond the scope of this paper to summarize the historical research on LD. Moreover, it is not necessary. The reader can consult authors in Spanish, such as Miranda

(1986) and Ortiz (2004), who follow the classification by Wiederholt (1974), and García (1995), who follows Hammill (1990). For the history of this concept in Spain, one can consult García (2001) and Jiménez (1999). In Spain, the less well-known historical description by Hallahan and Mercer (2001) contains five periods that range from 1800 to 2000. Here we will briefly mention two historical events whose presence in this article is justified because they help to understand the reforms in this field.

The first event, without considering the 19<sup>th</sup> century and part of the 20<sup>th</sup>, occurred in 1962 when Kirk (Kirk, 1962; Kirk & Bateman, 1962) coined the term *specific learning disabilities* which, one year later in 1963, would be used by an influential North American association of parents of children with LD (see Hallahan & Mock, 2002). Up until the year 2000, there were more than twelve definitions originating from laws, universities, associations and researchers, among others. Kavale and Forness (1998) believe that the problem in this field is of an intellectual nature: “we ‘know’ more than we ‘understand’” and, therefore, we have the “embarrassing situation of not being able to answer a rather fundamental question: What is a learning disability?” (p. 245).

This historical trend of disagreement about the definition and identification of the LD, which will probably continue in the short term (e.g., Hale, Kaufman, Naglieri, & Kavale, 2006), explains two facts. One is the extraordinary increase in the prevalence of LD. In the United States, the number of children with LD doubled in approximately 20 years (between 1976-1977 and 1998-1999), reaching 2.8 million children in the year 2000, which represents half of all children with disabilities (Hallahan & Mercer, 2001). This unprecedented increase is attributed, in part, to erroneous diagnoses. The second fact is the limited validity of many investigations on LD due to the heterogeneity of their samples.



The other historical event is that in spite of the definition problems, there have been a variety of approaches, tests and programs stemming from the diverse disciplines that have converged in the field of LD- psychology, neurology, education, ophthalmology and others-. In their brief history of LD in the United States, Moats and Lyon (1992) name approaches as diverse as *perceptual-motor training*, *psycholinguistics* and *constructivism*, each of them passionately defended and, at the same time, discredited, for not achieving “miracle cures” (p. 283). And they add: “the LD enterprise became an enormous machine – indeed, a factory– with attending cottage industries, fueled by legal, sociopolitical, educational, and entrepreneurial energy ... there has been no logical blueprint for this machine that could provide objective knowledge about who and how many children were at issue, why they could not learn, or how they might be helped. It is important to understand, albeit with hindsight, how we could have gotten so far ahead ourselves” (p. 283). Changing this situation with valid studies has been the great challenge in this field.

### **Future of the field of specific learning disabilities**

The great difference in the North American legal definitions from the year 2000 on, as well as the intellectual current that underlies them, is the conviction that no child should receive special education services without first having shown that he or she failed after receiving quality teaching (Fletcher, Morris, & Lyon, 2002). It is not difficult to foresee that for this decision to become reality in countries like the United States, and undoubtedly in Spain, it will be necessary to improve in at least three areas that we will mention here.

The first is the university training of students in teaching programs. Some studies have pointed out the surprising gaps in knowledge and understanding about learning to read among teachers (Moats & Foorman,

2003). Prevention is the best intervention in reading (the 2004 IDEA dedicates 15% of special education funds to prevention), and that means offering good reading instruction. Today we have a lot of information coming from research on reading and mathematics that is still not widely used in the classroom. Improving teacher training would have significant effects on the educational results, as primary school is where, at least in Spain, failure in school silently begins (Fernández-Enguita, Mena, & Riviere, 2010). This improvement would require structural and superficial changes, from a considerable increase in the credits assigned to the area of language teaching (only between 2.5% and 5% of the total number of credits in the Primary and Kindergarten childhood education degrees; furthermore, in Spain there are no post-graduate programs specifically in this area) to the creation of university textbooks on teaching reading based on the current knowledge; similar needs exist in the training of teachers in mathematics (see Blanco, 2001; Rico, 2000).

The next area is the quantity and quality of the educational materials, starting with the workbooks for teaching reading and the instruments for evaluating reading. Regarding the educational materials, the quality of our materials could also improve considerably by simply putting into practice what we already know. In this regard, Spain is behind countries like the United States, Great Britain, or Canada, which have quality educational materials like *Jolly Phonics* (Lloyd, 1993) or *Letterland* (Wendon, 1992), whose efficacy has been demonstrated in scientific investigations (e.g., Brunson, Colheart, & Nickels, 2006; Kenny, 2003; Kwan, 2005; Stornelli, 2002; Stuart, 1999, 2004; see also National Reading Panel, 2000). Regarding evaluation instruments, a *response to intervention* approach requires the use of brief tests with good sensitivity and specificity that can be applied in groups. They must allow the continuous monitoring of the students’ progress in reading throughout the school year, facilitating

decision-making and intervention. In Spain we do not have even one test of these characteristics (the so-called “screening” or early detection tests) with recognized reliability and validity.

Finally, we have gaps in knowledge and a lack of programs and methodologies that facilitate teaching based on scientific research on children with LDs, the most revolutionary idea of the new North American laws. This requires improving the third pillar: research. Although in Spain there are already some examples along these lines (Jiménez et al., 2010), we must increase the quality and quantity of research on instruction methods in reading and mathematics. Not all educational intervention yields positive results, and when it does, it is not always effective for everyone. Our research must help us to find out which interventions are effective and for whom. In addition, Spain and Latin America are multilingual societies with a laborious research agenda to discover how effective the interventions in the language(s) taught are.

Improving these areas would especially protect children with LDs and their families from receiving treatments that we know do not work, or that do not have enough scientific support, producing in the families and children another experience of failure and shattered hopes, in addition to economic cost, effort and time. The innovations discussed here remind us that professionals and researchers have an obligation to make the best research-based teaching methods available to all students.

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