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The process and criteria for diagnosing specific learning disorders: indications from the Consensus Conference promoted by the Italian National Institute of Health

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Abstract

A Consensus Conference on Specific Learning Disorders has been promoted by the Italian National Institute of Health (Istituto Superiore di Sanità, ISS). The Consensus Conference consisted in a systematic review of the international literature addressing the issues of diagnosis, risk factors and prognosis, treatment, service delivery and organizational models for Specific Learning Disorders (reading, spelling/writing, calculation). Selected papers were examined by a group of Evaluators and then discussed by a Scientific and Technical Committee, whose conclusions were examined and approved by a Jury Panel. The part on diagnostic issues is presented here, encompassing a systematic discussion of the use and appropriateness of diagnostic criteria, parameters, tasks and psychometric indexes as illustrated in the literature, and providing recommendations for clinical practice. Special attention has been devoted to the collection, analysis and discussion of published data concerning languages with transparent orthography. Controversial issues such as discrepancy criteria, role of reading comprehension and importance of accuracy and fluency are discussed.

Key words

- Consensus Conference
- Specific Learning Disorders
- diagnosis
- criteria
- parameters

INTRODUCTION

Although Specific Learning Disorders (SLDs) are one of the most common neurodevelopmental disorders affecting children, there is still high variability in SLD prevalence estimates, due to a lack of univocal diagnostic criteria. Differences in prevalence data might be due to varying definitions of SLD, to the different methods used for diagnosis, as well as to the different age ranges that are considered in the various studies. In Italy, an attempt to clearly define diagnostic criteria for SLD was made during the Consensus Conference promoted by the National Institute of Health (Istituto Superiore di Sanità, ISS) and celebrated on 6-7 December 2010. The Consensus Conference aimed to find a consensus about the clinical conditions associated with reading, writing and calculation disorders in school-age children. It provided an updated, systematic and critical review of the scientific literature on issues related to diagnostic criteria (A-questions), risk factors and prognosis (B-questions), intervention (C-questions), organization of service delivery (D-questions). The resulting document (retrievable from www.snlg-iss.it./cc_disturbi_specifici_apprendimento) was published in June, 2011, and sent as national guidelines to all diagnostic centers, clinical services, public

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pediatricians and schools of the Italian territory. It is now considered as the reference document for diagnosis and intervention on SLD in Italy.

The present paper reports and discusses questions and recommendations related to diagnostic issues and processes (A-questions), which were the topics on which some of the authors had been specifically involved as experts appointed within the Scientific and Technical Committee (authors 1, 4 and 5) or as Evaluators (author 2).

The international disease classification manuals used as a reference for SLDs are:

- ICD-10 (F81 Specific developmental disorders of scholastic skills) [1]
- DSM IV TR (315 learning disorders) [2]

SLDs affect the skills involved in academic learning. They include a series of medical conditions distinguished on the basis of functional deficits:

- dyslexia, *i.e.*, a disorder in reading (the ability to decode a text);
- dysorthography (also referred to as spelling disorder), *i.e.*, a disorder in writing (orthographic skills and phonographic coding);
- dysgraphia, *i.e.*, a disorder in hand-writing (graphomotor skills);
- dyscalculia, *i.e.*, a disorder in number and calculation skills (the ability to understand and use numbers in computations).

In these disorders, the normal acquisition of the processes of reading, writing and calculation is affected by an underlying neurobiological dysfunction. Additionally, environmental factors – such as school, home, family and social context – contribute to determine their phenotypic expression [1, 2].

It is known that SLDs are chronic, developmental disorders, and their expression is modulated by the patient's age and by other environmental variables. That is, a disorder may manifest itself with different characteristics during different developmental and educational stages. Thus, diagnoses of SLD show a peak in primary and secondary school. In addition, the clinical expression of the disorder depends on the orthographic complexity of the written language. Indeed, orthographic complexity allows to differentiate between opaque languages – such as English, characterized by a complex relationship between graphemes and phonemes – and transparent languages – such as Italian, characterized by a direct and predictable relationship between phonemes and graphemes. The orthographic complexity of a language has an impact on the processes activated for reading and writing, and consequently on the instruments that are used for assessment and intervention. Therefore, scientific evidence collected on English-speaking subjects cannot be directly extended to transparent languages such as Italian [3].

The diagnosis of SLD cannot be formulated in the first stages of reading and writing acquisition, since enough time should be allowed for the teaching and learning processes to be completed. Thus, dyslexia and dysorthography are typically diagnosed from the end of the second grade, and dyscalculia from the end of the third grade. Indeed, anticipation of the diagnosis would increase the risk of false positives. Nonetheless, it is possible to identify early (personal and social) risk indicators of learning disorders that can enable early intervention and timely diagnosis [3].

Co-morbidity of SLD with other disorders is frequent, both with other neuropsychological dysfunctions (such as ADHD, *i.e.*, Attention Deficit and Hyperactivity Disorder) and with psychopathological disorders (anxiety, depression and conduct disorder) [1, 2].

In the Italian language, SLD prevalence ranges between 2.5 and 3.5% of school-age population, as estimated by a national epidemiological study currently in progress. Children with SLD represent about 30% of school-age patients diagnosed at Child psychiatry services, and about 50% of patients receiving intervention. However, SLDs are probably often underdiagnosed and/or confused with other disorders [3].

SLDs have a major impact on both the individual (lowering academic achievements and even causing a premature dropout of school) and the social level (limiting social and individual expression). Scientific evidence highlights that only timely interventions can improve academic performance (a measure of adaptive functioning in children). In fact, early and timely intervention is regarded in the literature as a positive prognostic factor. To this aim, professionals and institutions are collaborating in order to disentangle the symptomatic conditions of SLD at various stages of development. In addition, pediatricians must take into account the risk factors reported in the medical records, and the school difficulties reported by families. Teachers should be able to identify children with persistent difficulties in learning and report the problems to the families, directing them to the appropriate health services for clinical evaluation. Child Psychiatry Services provide evaluation and diagnosis, and ensure appropriate support for those patients who meet the diagnosis of SLD.

The implementation of shared clinical practice for diagnosis, involving the use of assessment protocols based on standardized tests, as well as a scientifically based rehabilitation programs, would allow to make intervention more effective. It would also promote a process of systematic research on the effectiveness of therapeutic interventions in the Italian-speaking population. The use of evidence-based diagnostic criteria may also help distinguish SLD from other non-specific school achievement problems, usually related to familial, environmental and cultural factors or to cognitive, neurological, sensory or motor deficits.

This Consensus Conference was held soon after the enactment of Law No. 170, 8 October 2010 (relating to SLD in school) [4] that defined the rights and the actions necessary for the promotion of SLD patients. Therefore, the clinical recommendations proposed by this Consensus Conference, held in Rome on the 6th and 7th December 2010, are generated in a social and cultural context full of initiatives and open debate. Close to the publication of the document, a group of representatives of various associations and institutions involved in SLD diagnosis and management (neuropsychiatrists, psychologists, speech therapists, special education and regular education specialists, geneticians, audiologists, ophthalmologists and optometrists, etc., some of which were among the promoters of the Consensus Confer-

ence presented here) published a further document, retrievable from www.lineeguidadsa.it, aiming to collect, discuss and substantiate the clinical protocols commonly used at a national level and trying to converge on shared "good practice" lines. This document answers a different series of questions concerning diagnostic issues for SLDs and provides practical indications about the processes and instruments that are relevant to their assessment and management, originating from the analysis of clinical materials and protocols, and thus fruitfully integrates and complements the more rigorous, evidence-based indications of the ISS document.

The following section of this paper will present the methodology. Then, the specific questions and subquestions (here defined as "Focuses"), the analysis of the relevant literature, the conclusions and the Recommendations of the Consensus Conference will be detailed. To facilitate reading, the Recommendations concerning each Question and Focus will be presented in the form of Tables.

METHODS

The Consensus Conference was conducted according to the standards defined by the Consensus Program Development of the National Institutes of Health (NIH), US. The methodology is described in the methodological manual "How to organize a Consensus Conference" (The National Guidelines System) [6].

Organization (people involved and their tasks)

The promotion and organization of the Consensus Conference involves different subjects, whose tasks are briefly described below.

a) The Organizing Committee – composed of representatives of the Istituto Superiore di Sanità (ISS, National Institute of Health), independent experts and representatives of associations of families – was involved in:
- promoting the conference;
- arranging the various stages of the conference;
- identifying the members of the Scientific and Technical Committee;
- identifying the members of the Jury Panel;
- formulating, in accordance with the Scientific and Technical Committee, the questions for the Jury Panel;
- providing guidance and methodological support to the experts for the preparation of the drafts to be submitted to the Jury Panel.

b) The Scientific and Technical Committee was composed of members with recognized competence in the field of SLDs (including child psychiatrists, psychiatrists, neurologists, psychologists and speech therapists). All of them were identified by the ISS promoters, based on their academic and/or clinical positions and on their experience with multidisciplinary work, and invited by the Organizing Committee. Their tasks included:
- formulating, in accordance with the Organizing Committee, the questions to be submitted to the Jury Panel;
- appointing experts who were in charge of drawing reports on individual questions to be submitted to the Jury Panel and orally presented and discussed during the Consensus Conference.

c) The Jury Panel was selected by the Organizing Committee in order to ensure the necessary multidisciplinary and multi-professional approach in the evaluation of the recommendations; it was composed of 16 members identified on the basis of intellectual autonomy, authority in science, representativeness and high cultural and moral character, and was in charge of:
- signing a document specifying the procedures to be applied within the panel;
- reading the reports prepared by the experts;
- attending the presentation and the discussion of reports during the Consensus Conference;
- discussing, revising and approving the document to be presented before the closing of the conference;
- drawing up and approving the final version of the consensus document.

Within the Jury Panel, the writing committee was in charge of preparing the final consensus document, revising the recommendations of the preliminary document and adding further commentaries.

The experts considered the following issues:
- evaluation of the diagnostic procedures currently in use (A-questions);
- epidemiological classification of SLD (risk factors and prognosis), classification of a set of tools for the identification of subjects at risk for SLD and tools for intervention (B-questions);
- effectiveness of currently available rehabilitation interventions (C-questions);
- organizational models and service delivery (D-questions).

The current paper, as stated in the Introduction, describes how the Consensus Conference addressed issues related to the diagnostic process (A-questions).

The literature review was surveyed by the experts of the Documentation Department of the ISS. A panel of evaluators reviewed the selected studies with respect to a range of aspects (*e.g.*, methodology, results, etc.) and prepared grids and tables for each study, including specific details about the clinical questions and the study design. The experts evaluated and summarized the scientific evidence available for each topic in a series of scientific reports (retrievable at www.snlg-iss.it/cms/files/Allegato_CC_DSA.pdf.). The reports were then passed to other experts in order to allow a process of internal peer review before final delivery to the Jury about a month before the conference took place. Finally, they were submitted to public discussion. The Conference coordinators surveyed the preparation of materials and the circulation of the drafts; the Secretariat's Organization coordinated the logistic and operational aspects of the conference.

To facilitate the work of experts and ensure uniformity in the presentation of scientific evidence on the various topics, the ISS systematically reviewed the literature for each of the areas covered in the conference. The scientific literature was surveyed on a number of query databases such as PubMed, Embase, Cochrane Database of Systematic Reviews and PsycINFO. The key terms entered in the search strategy were: ((Learning Disorders)

OR Dyslexia OR Reading OR Writing OR Mathematics) NOT ((Dyslexia, Acquired) OR (Alexia, Pure)). Studies on acquired dyslexia were excluded. Only studies published in English and Italian between January 1990 and March 2010 and involving individuals aged less than 44 years were included. The strategies and the database are available on the National Guidelines System website (www.snlg-iss.it./cc_disturbi_specifici_apprendimento).

The Organizing Committee provided experts and evaluators with detailed methodological indications about how to select the sources to be included in the bibliography. In addition the evaluators were asked to fill-out special grids with information about methodology and results of the selected studies, to facilitate the experts in their analysis. Scientific studies were included according to the following criteria:

- systematic reviews with or without meta-analyses and experimental studies (*i.e.*, case reports, case series, non-systematic reviews, experts' opinions were excluded);
- in case of multiple systematic reviews on the same topic, only the most recent one was considered;
- in case of multiple reviews on the same topic, only those showing the greatest methodological validity and internal consistency were considered;
- the studies had to show good internal validity (appropriateness of the study design, statistical analysis, and results presentation), adequacy of the sample size and transferability of the results to the SLD population.

A total of 42 studies were finally considered in order to answer the Questions addressed in point A.

RESULTS AND RECOMMENDATIONS

The list of questions, and specific focuses that will be addressed in the present paper is:

A1 Question. What are the diagnostic criteria for the diagnosis of SLD (in reading, spelling, calculation)?

Focus 1. The discrepancy between reading achievement and IQ

Focus 2. Cut-offs and scores

A2 Question. Which are the parameters (accuracy and reading fluency, etc.) to be used in the assessment of reading, spelling and mathematical abilities for the diagnosis of SLD?

Focus 1. Role of reading comprehension

Focus 2. Accuracy vs *fluency*

A3 Question. Which types of psychometric tests and which indexes should be used to assess reading, spelling and calculation disorders?

Focus 1. Types of tests

The results of the literature review, the experts' commentaries and the recommendations for clinical practice will be presented for each question and focus.

A1 Question. What are the diagnostic criteria for the diagnosis of SLD (in reading, spelling, calculation)?

Premise

According to the ICD-10 and the DSM-IV TR diagnostic manuals, used by the Italian Health System, a series of conditions must be met in order to formulate a diagnosis of Specific Learning Disability (see *Appendix 1 and 2*). It is interesting to note that the ICD-10 and the DSM-IV TR diverge with respect to the definition and the diagnosis of Specific Spelling Disorders. In fact, whereas the ICD-10 recognizes the existence of a developmental disorder of written expression specific to spelling, according to the DSM-IV TR a "Disorder of Written Expression" can be diagnosed only when difficulties in written expression go beyond poor or illegible handwriting and poor spelling, and extend to sentence and discourse construction. In addition, under the ICD-10 classification, in contrast to the DSM-IV TR, the co-occurrence of a reading disorder is considered as an exclusion criterion for the diagnosis of "Specific Spelling Disorder". In other words, ICD-10 considers reading and spelling disorders as two aspects of the same problem, while DSM-IV TR underscores the differences between the two, at the same time broadening the concept of writing disorder beyond spelling difficulties.[1]

The diagnostic criteria for the "Specific Disorder of Arithmetical Skills" in the ICD-10 establish that skills assessed with standardized tests must fall outside the limits of 2 standard deviations (SD) "from the level expected based on the child's chronological age and on his overall intellectual level". However, these criteria do not specify any parameter (*e.g.*, fluency, accuracy) nor any specific skill to be considered for evaluation (*e.g.*, mental numerical computation, etc.). Additionally, in order to make a diagnosis, the absence of "a history of either significant difficulties in spelling and reading" must be ascertained, and scores in both these areas have to be within the normal range (within 2 SD). That is, the diagnosis is excluded in cases of "difficulties associated with a reading or spelling disorder". In this case, the most frequently encountered in clinical practice, it will be necessary to make a diagnosis of "Mixed Disorder of Scholastic Skills". The DSM-IV TR provides indications similar to the ones given for the other disorders and does not specify which parameters and which skills should be taken into consideration for the diagnosis.

In addition to the differences between the two diagnostic manuals described thus far, the application of diagnostic criteria under both manuals raises a number of issues that will be highlighted and discussed in the next section.

Focus 1. The discrepancy between reading achievement and IQ (discrepancy criterion)

According to the DSM-IV TR and ICD-10, learning disorders are defined with respect to a discrepancy criterion, that is, the level of performance in tests of reading, writing or calculation must be significantly lower than expected, based on education and intellectual level. The discrepancy criterion has been historically interpreted in several ways. The two main approaches to the discrepancy criterion are reported below:

a) calculating the standard values for both the intellectual level and school performance, and requiring that the difference between the two values exceeds the limit

1. In the final version of DSM-5, the problem of distinguishing between reading and spelling disorders is partially overcome by the inclusion of all "symptoms" in a single diagnostic category, although use of more detailed specifiers is recommended. Nonetheless, extension of writing disorders beyond simple spelling errors is preserved and further emphasized.

of 1 or 2 SD (a mathematically more sophisticated approach but almost never used in Europe is a regression analysis that includes as a factor the correlation between IQ scores and reading skills);

b) setting the cut-off for both school performance (normally not above the maximum level of -1, -1.5, or -2 standard deviations below the mean or the 10th or 5th percentile with respect to age and education) and intellectual level (usually not below the minimum level of 85 IQ points).

Alternative solutions proposed in the literature can be considered variants of these two original approaches.

It is important to examine in detail the implications of these two positions. The first approach allows fluctuation of performance scores: the diagnosis of SLD can be made also when the performance on standardized tests is not below age mean, provided IQ is particularly high. Alternatively, it allows to diagnose SLD when IQ is lower than 85, provided performance on standardized tests is sufficiently discrepant. Clearly, this approach is based on the assumption that academic ability can be predicted on the basis of intelligence. In fact, the correlations reported in the literature between IQ scores and reading skills are rather low, ranging between 0.6 and 0.75. A mathematical procedure to calculate "expected performance" on the basis of IQ was applied in the American context, with controversial results, but no such formulas have been made available for languages such as Italian.

The second approach is the most frequently adopted in the European countries and does not require to define the exact relationship between IQ and academic skills. Nonetheless, excluding from the diagnosis subjects with an IQ below 85, even in the presence of very low levels of performance, implies that low performance in these cases is assumed to be of a different nature than in the case of subjects with IQ in the normal range (excluding mental retardation, the problem arises for children with IQs between 70 and 85, the so-called "borderline" cases). Thus, although less explicitly, this position also rests on the assumption that a low IQ score *per se* can explain poor performance in reading, writing and computing. It would be possible, therefore, to hypothesize a substantial difference between two types of "poor readers": those showing a significant discrepancy between their IQ level and their performance, and those exhibiting a low but non-discrepant performance. Several studies have been conducted to explore the validity of this hypothesis. An analysis of these studies is reported in the following sections, subdivided according to the specific type of SLD (reading, spelling/writing, number and calculation skills).

Reading

A number of studies [6, 7] observed that discrepant children (*i.e.*, children showing a significant discrepancy between their IQ and their reading performance) did differ from non-discrepant ones with respect to cognitive abilities as expected (Verbal, Performance and full-scale IQs, syntax and vocabulary tests), but their performance overlapped in tests of phonological awareness, rapid naming and verbal memory. Additionally, there were no differences between the two groups in reading comprehension, mathematical concepts, spelling and writing. A longitudinal study [8] further indicated that non-discrepant children showed an overall better performance in a range of standardized tests than the discrepant ones in the second, but not in the fifth grade. A study employing cluster-analysis indicated that various subgroups of children with varying degrees of reading abilities could be identified based on their neuropsychological profiles, but these subgroups did not differ in IQ [9]. Taken together, these studies suggest that an accurate description of cognitive profiles is more useful to inform diagnosis than IQ is[2].

Studies conducted in orthographically transparent languages led to similar results. Jiménez and Rodrigo [10] observed that performance on a lexical decision task was a more critical factor than IQ scores in order to discriminate between a group of Spanish-speaking children with SLD and age-matched controls. In Swedish, a language with a moderately transparent spelling, Svensson and Jacobson [11] showed that the inclusion of IQ as a diagnostic criterion led to a lower stability in the diagnosis of SLD between 9 and 19 years of age.

Rispens *et al.* [12] further observed that inclusion of discrepancy as a diagnostic criterion had little effects on the number of children (first and second grade of primary school) diagnosed with a learning disorder: excluding IQ from the model, the number of diagnoses increased by 0.2-0.5% (depending on the reading test used). The lowering of the cut-off on IQ from 85 to 80, by contrast, had a greater impact, increasing diagnoses by 1,3-1,5%. Giovingo *et al.* [13], on the other hand, showed that use of IQ-discrepancy criteria applied to a group of students with school difficulties leads to a significantly lower number of diagnoses (24-29% of the sample) if compared with two other methods, one based on intra-individual discrepancy with respect to other performances, the other corresponding to an underachievement criterion, with an absolute cut-off (16^{th} percentile) on performance (diagnosis rates of 40 to 65%).

Questioning the usefulness of IQ scores to predict response to treatment, Stage *et al.* [14] showed that Verbal IQ did indeed predict reading improvement after an intervention program on word and non-word reading, but its predictive power was weaker than that of phonology, rapid naming and attention tests.

Further problems concern the statistical properties (reliability, stability) of the assessment results (see [15] for a detailed discussion). First, the correlation between IQ scores and reading and writing skills is weak [16], decreases considerably from 8-9 years of age to 10-12 years [17] and is much lower than that found in the normal population (but see [18] for a different view). The specific test used to assess IQ seems to

2. A recent neuroimaging study by Tanaka *et al.* (2011) published in *Psychological Science* (http://pss.sagepub.com/content/early/2011/10/17/0956797611419521) confirms the absence of any significant difference between discrepant and nondiscrepant poor readers also with regard to cortical activation patterns during dyslexia-related phonological processing tasks.

play a determinant role in producing these contrasting results. A second issue refers to the stability and reliability of the IQ measures. Ingesson [19] showed that full-scale IQ remained substantially stable over time as a result of a progressive decrease in Verbal IQ and increase in Performance IQ along with age. A third problem relates to the use of cognitive tests which may be influenced by the presence of language or reading disorders (language disorders may for instance influence comprehension of instructions or prevent the use of an inner guide during performance, while reading disabilities may prevent the acquisition of information from textbooks etc.). Such interferences might lead to underestimate the child's cognitive potential [20, 21]. Lowering of IQ scores due to progressive decrease in motivation as a consequence of the learning disorder, known as "Matthew effect" is a further possibility that should be taken into account (see [19], but also [18] for a contrasting view).

Spelling and writing

As for spelling disorders, data from the literature predominantly relate to English (for the Italian language, see [22, 23]) and involve populations of children who meet the diagnosis of dyslexia, but not of specific spelling disorder according to ICD-10. This may reflect the fact that spelling disorders are usually considered to be associated with reading disorders: indeed, many neuropsychological functions are involved in both reading and writing. In the description of participants' characteristics, the criterion of discrepancy between writing/spelling achievement and IQ scores is not directly mentioned. As a result, data and conclusions of the existing studies on spelling disorders cannot be disentangled from the characteristics of dyslexia and considered specific to spelling/writing disorders per se.

Number and calculation skills

The problem of variable diagnostic criteria applies also to the specific disorder of arithmetical skills, so that it is difficult to compare research data. There are, nonetheless, some particularly critical issues that have been more systematically addressed in the international literature and that will be illustrated in greater detail. These issues include a) the validity of discrepancy-criteria as compared to cut-offs on performance; b) the relevance of criteria based on the specific type of difficulty as compared to performance level in general and c) the expression of the disorder over time.

a) The first question has been addressed in a study [24] comparing the results of the application of traditional discrepancy (between IQ and performance) criteria versus a cut-off on performance only. The authors underscore that mathematical difficulties are not simply the expression of low intellectual functioning (see also [25, 26]), and conclude that the second approach is more valid than the former one. The generalizability of the conclusions is limited, though, by the inclusion, in all the mentioned studies, of children with IQs above 80 only.

b) As to the question of the informativeness of the specific difficulties manifested by the children, a meta-analysis [27] suggested that criteria based on the specific type of difficulty, *e.g.*, in number facts [28] or number processing [26] are particularly meaningful.

c) A further important criterion seems to be the persistence of the disorder over years [24, 27, 29-31]. Indeed, after primary school, subjects with a disorder of arithmetical skills keep showing difficulties in solving simple tasks [29]. In particular, the most stable deficit concerns the recovery of arithmetic facts, while procedural difficulties improve more frequently [30]. Among other studies, Mazzocco *et al.* [29] observed that children with Mathematical Learning Disabilities (MLD, performing below the 10th percentile on standardized mathematical tests) improved their performance at a slower pace as compared not only to controls (typical achievers, TA), but crucially to low achievers (LA, performing between the 11th and the 25th percentile) as well (MLD <LA <TA). Thus, low achievers (LA), but not dyscalculic children (MLD), tended to reduce their lag with respect to controls (TA) over time.

Conclusions

With respect to the discrepancy criterion reported in the diagnostic manuals, it is a common clinical practice to make a diagnosis of SLD only in the presence of IQ scores higher than or equal to 85. However, the use of this criterion is controversial on the basis of:

a) empirical research over the last 20 years, showing that: 1) there are no substantial differences between discrepant and non-discrepant children in neuropsychological profiles (except for obvious differences in intellectual skills), or in response to treatment; 2) the diagnosis based on the discrepancy criterion appears to be less reliable and less stable over time, depending on the nature and on the type of tests used;

b) the new diagnostic trends, which tend to reduce the role of IQ scores. The new edition of DSM, DSM-5 (see *Appendix 3, 4 and 5*), is going to modify Criterion A in a substantial way, with direct reference to IDEA regulations (2004) [32] in the US which state that: "the criteria adopted by the State must not require the use of a severe discrepancy between intellectual ability and achievement for determining whether a child has a specific learning disability, as defined in 34 CFR 300.8(c)(10)".

Note that similar considerations apply to the diagnosis of Dysorthography/Spelling disorders, although there are no studies to our knowledge which have addressed the problem of different characteristics in samples of dysorthographic children with different levels of intellectual ability[3].

3. In one of the first studies taking into account the effects of intelligence scores on spelling ability, Finucci and colleagues (see Brain and Language 1983, 20(2), 340-355) found no relationship between spelling performance and IQ in reading-disabled children, but no IQs lower than 95 were included in the sample; a recent follow-up study on mid-age adults with former diagnoses of reading and spelling disorders, allowing greater variation of IQ scores (above 70) confirms the absence of IQ effects on spelling in spelling-disordered individuals (Maughan *et al.*, 2009, published in *Journal of Child Psychology and Psychiatry* 50.8:893-901).

A1 Question. What are the diagnostic criteria for the diagnosis of SLD (in reading, spelling, calculation)?
Focus 1. Discrepancy criterion

Recommendations

A1.1 A more flexible consideration of the criterion of a discrepancy between performance and IQ is recommended when diagnosing SLDs.

A1.2 Use of multicomponential tests for intellectual assessment is recommended in the presence of borderline IQ (70-85) levels, when diagnosing SLDs, since the cognitive profile is more informative than the mere IQ scores.

A1.3 When diagnosing SLDs, it is rather recommended to emphasize the discrepancy with respect to expected performance according to the subject educational level.

Focus 2. Cut-offs and scores

In order to identify poor performance on academic tests, that might be of clinical interest, the diagnostic manual ICD-10 indicates a cut-off of -2 SD (or the 5 th percentile) below the mean. However, in the literature on dyslexia cut-off levels are often much higher (the 25th or the 15th percentile are often referred to).

As for dyscalculia, the cut-offs reported in the literature are also very variable, ranging from the 5th percentile [31] to the 46th [33], and so are the various tests used to measure arithmetic skills (as a result, reported prevalence is also not uniform: Ramaa and Gowramma [34] address this issue and suggest a figure of about 5%). Recent studies suggest to consider as dyscalculic only children whose performance falls below the 10th percentile in at least two specific tests of basic arithmetic skills, whereas Low Achievers (LA) perform between the 11th and 25th percentile, and Typical Achievers (TA) perform above the 25th percentile [24, 29, 30].

A1 Question. What are the diagnostic criteria for the diagnosis of SLD (in reading, spelling, calculation)?
Focus 2. Cut-offs and scores

Recommendations

A1.4 In the absence of clear indications from the literature on the use of specific cut-offs in the assessment of academic skills for the diagnosis of SLDs, the application of the cut-offs suggested by the diagnostic manual ICD-10 should be recommended.

A1.5 The use of standard deviations (especially for speed scores, more symmetrically distributed) and percentiles (especially for accuracy or error scores, characterized by asymmetric distributions) according to available norms is recommended, since the distributional properties of these scores ensure better precision in measuring performance than grade-equivalent scores. In fact, the function describing change in performance according to school grade is too far from linear to allow calculation of meaningful and comparable measures of achievement or backwardness (*e.g.*, a 3-years lag at primary school has a very different meaning if compared with a 3-years lag at college).

A2 Question. Which are the parameters (accuracy and reading fluency, etc.) to be used in the assessment of reading, spelling and mathematical abilities for the diagnosis of SLD?
Focus 1. Role of reading comprehension

The diagnostic manuals ICD-10 and DSM-IV include reading comprehension in addition to the parameters of accuracy and fluency. However, in accordance with the latest scientific evidence, performance in reading comprehension is rarely considered in the clinical practice in countries with orthographically transparent languages, such as Italy, and, more recently, also in Anglophone countries. These issues had been given special emphasis in the proposed revisions of DSM-IV as retrieved from the APA site in November 2010 (see *Appendix 4*)[4]. It is clear, indeed, that problems in comprehension are not closely related to difficulties in decoding (which underlie the process of reading and writing), and cannot be viewed as simple consequences of their presence. In the typically developing population, the relationship between reading and comprehension decreases with schooling (as described in the model "simple view of reading" by Gough and Tunmer [35]), indicating that as the decoding process becomes more automatized, its ability to predict reading comprehension weakens [36-38].

For instance, Nation and Snowling [39] analyzed intercorrelations of performance on a set of reading, reading comprehension, sentence completion and listening comprehension tests, in a sample of 184 children aged 7 to 9, also including 17 children with oral comprehension difficulties. All tests turned out to be highly intercorrelated, except for the listening comprehension and the non-word reading test. Similarly, Snyder and Downey [40] reported that in 8-11 years old children with reading disorders, reading comprehension was predicted by accuracy in sentence completion and lexical retrieval tasks, whereas for 11-14 years-old children, inferential skills (the ability to integrate missing information) are better predictors. Again, Nation *et al.* [38] observed that poor comprehenders scored significantly lower than controls in syntactic awareness, listening comprehension and expressive vocabulary tasks, but not in phonological and meta-phonological tasks.

Conclusions

It seems clear that the ability to comprehend written text is at least partially independent of decoding abilities (although it can obviously be affected by the presence of decoding deficits) and cannot be included among the parameters to be evaluated for the diagnosis of Specific Reading Disorder or Dyslexia. One possibility could be to diagnose a Disorder in Reading Comprehension without decoding deficits (some authors propose to consider it as a linguistic disorder). Another possibility (indicated by the proposed revisions of the DSM-IV TR, see *Appendix 4*)[5] is the classification as a Learning Disorder (super-ordinate category), without further specification.

4. The final version of the DSM-5 (not available at the time of celebration of the Consensus Conference) has radically changed its perspective, and a more general category of Specific Learning Disorders, including comprehension and mathematical reasoning, is now being proposed instead. *Appendix 5* (text retrieved from APA site in August 2013) gives an overview of the actual recommendations of DSM-5.
5. In the final version of DSM-5, however, comprehension difficulties have been included in the list of deficits belonging to the category of Specific Learning Disorders.

A2 Question. Which are the parameters (accuracy and reading fluency, etc.) to be used in the assessment of reading, spelling and mathematical abilities for the diagnosis of SLD? *Focus 1. Role of reading comprehension*

Recommendations

Premise: ICD-10 criteria for diagnosis are fully maintained unless otherwise specified, with the modifications indicated in the recommendations in re sponse to questions A1 and A2. In particular, the exclusion of IQ scores below 70, as assessed with a valid, standardized, individually administered test, is unmodified.

A2.1 We recommend, for the purposes of diagnosing dyslexia, not to include reading comprehension as a diagnostic parameter, since persons with comprehension problems but good decoding skills do not meet the criteria for dyslexia.

A2.2 We recommend however, when diagnosing dyslexia, to keep considering comprehension in passage-reading tests as one of the critical tests to be used for a broader functional characterization of the disorder (see recommendations related to the question A3).

Focus 2. Accuracy vs *fluency*

It has been shown that, in orthographically transparent languages, fluency is a more sensitive indicator of the presence of a reading disorder as compared to accuracy, especially after the first years of schooling.

A number of studies conducted in orthographically transparent languages provided evidence that fluency is a major predictor of reading difficulties as compared to accuracy. For instance, German-speaking children with dyslexia showed more difficulties in fluency than in accuracy in word and non-word reading [41, 42]. Lehtola and Lehto [43] showed similar results for Finnish- (a highly transparent orthography) speaking students with dyslexia. On the other hand, both Landerl *et al.* [42] and Davies *et al.* [44] showed that German and Spanish children with dyslexia, albeit being less fluent and accurate than age-matched controls in reading tasks, were less accurate but equally fluent when compared to reading-age controls.

As for spelling and writing, fluency is usually not explicitly mentioned as a diagnostic criterion [45, 46]. Angelelli *et al.* [22, 23] specified that accuracy in writing performance had been taken as the diagnostic parameter in her studies (which set a cut-off of -2 SD below the mean of age-matched controls and also provide an accurate analysis of error types).

The issue of accuracy versus fluency parameters has been addressed also for the diagnosis of Dyscalculia. Many authors consider fluency a more relevant parameter as compared to accuracy [25, 47, 29], whereas others observe that accuracy does not improve by allowing extra time on the task [31]. A careful examination of the type of errors is recommended, in order to provide reliable indications about the disorder, and differentiate children with Dyscalculia from low achievers and typically developing children. Mazzocco e*t al.* [29] reported that low achievers differed from typically developing children with respect to the number of errors, but not in the type of errors. By contrast, children with dyscalculia differed from the other two groups in both the number and the type of errors, indicating an atypical development.

Conclusions

Based on research data, it appears that in addition to reading accuracy, reading fluency is the most sensitive parameter for the detection of reading difficulties in orthographically transparent languages such as Italian. As for arithmetic skills, both parameters appear to be sensitive, whereas for spelling and writing skills, fluency has not been systematically addressed in the analyzed literature as a diagnostic parameter.

Another important source of information for the purpose of diagnosing disorders of writing and arithmetic skills is the qualitative analysis of errors. In doubtful cases, in fact, the type of errors could help differentiating between low achievers and subjects with a specific learning disorder.

A2 Question. Which are the parameters (accuracy and reading fluency, etc.) to be used in the assessment of reading, spelling and mathematical abilities for the diagnosis of SLD? *Focus 2. Accuracy* vs *fluency*

Recommendations

A2.3 For the diagnosis of dyslexia, it is recommended to consider reading fluency in addition to the parameter of accuracy as reported in the ICD-10 manual criterion A.

A2.4 For the diagnosis of dysorthography, it is recommended to consider accuracy parameters in standardized tests for spelling, as reported in the ICD-10 manual criterion A,

A2.5 For the diagnosis of dysorthography, it is recommended to use qualitative analysis of errors as an additional source of information that can help guiding the diagnosis and defining functional profiles, in order to differentiate low achievers from subjects with a specific learning disorder.

A2.6 For the diagnosis of dyscalculia, it is recommended to consider the parameters of both accuracy and fluency in standardized tests for arithmetic skills, as reported in the ICD-10 manual criterion A.

A2.7 For the diagnosis of dyscalculia, it is recommended to include qualitative analysis of errors as an additional source of information that can help guiding the diagnosis especially in doubtful cases, in order to better differentiate low achievers from subjects with a specific learning disorder.

A3 Question. Which types of psychometric tests and which indexes should be used to assess reading, spelling and calculation disorders?

Focus 1. Types of tests

In the literature, as well as among assessment instruments available in the Italian language, there are different types of reading tests, including word, non-word, sentence and passage reading tests. Presumably, the choice of different diagnostic tests in different studies has the effect to select different subgroups within the SLD population, with different cognitive and performance profiles.

Interestingly, meta-analysis studies and experimental evidence indicate that spelling and non-word reading abilities are better predictors of word reading than phonological awareness and rapid naming skills [46]. Additionally, phonemic awareness appears to lose power over time in predicting reading performance, while scores on linguistic tasks such as vocabulary and naming tests appear to be more stable predictors [48]. Additional evidence revealed that accuracy in a non-word reading test is not predicted by performance in a passage reading test, but rather by word reading scores [49]. Word and non-word reading appeared to be so strongly correlated in the first four years of schooling, that they could be considered expressions of the same construct [50]. In this study, phonological awareness appears to be more correlated with word than with non-word

reading, while RAN (Rapid Automatic Naming) and phonological awareness were equally good predictors of word and non-word reading. Further evidence however suggests that improvement in word reading is strongly associated with Verbal IQ, whereas improvement in non-word reading is best predicted by tests of phonology, RAN and attention [14].

Evidence form studies on dyslexia in adults indicated that subjects with a reading disorder are significantly slower and less accurate in non-word than in word reading [51]. Lyytinen *et al.* [17] showed that phonological spelling and orthographic word recognition abilities predicted reading comprehension of Finnish students when they were 11 years old, with phonological tasks increasing their predictive power with respect to text comprehension with age, compared with orthographic tasks. Svensson and Jacobson [11] reported that a cut-off criterion of -1 SD below the norm in non-word reading allows to identify subjects with dyslexia at 9 and 19 years of age. A study on Malaysian-speaking (a language with regular orthography) first-grade children, showed that both word and non-word reading tests (highly correlated) strongly correlate with a spelling task, a passage comprehension test and a meta-phonological test [52]. Miller-Shaul [53] observed that adult participants with a reading disorder in Israel perform significantly poorer than age-matched controls in phonological tasks but not in orthographic tests.

As for the type of tests used for the diagnosis of writing/spelling disorders, most studies in the literature use dictation tests. A longitudinal study in Italian [23] indicated that the nature of the writing difficulties involved in spelling disorders changes with age and education. Interestingly, Italian children with Dyslexia early learn to avoid errors in phoneme-to-grapheme conversion and syllabic conversion tasks, while they keep making many errors on a lexical basis. Gregg *et al.* [54] studied the interrelationships between phonemic awareness and orthographic awareness and their influence on writing skills, showing that spelling skills were largely independent of phonological awareness and related to the acquisition of a lexical strategy for writing.

As for dyscalculia, different criteria and tests have been used in the literature, which is one of the reasons why experimental groups so often showed different clinical features and were not comparable. Previous studies did not discuss the assumptions underlying the distinction between a type of dyscalculia based on a numerical cognition deficit and another type based on procedural deficits. Rousselle *et al.* [47] observed that children with a deficit in number skills have problems in accessing number magnitude from symbols rather than in processing numerosity per se. Other studies have suggested that the profile may be more impaired in the presence of comorbid reading disorders [33, 55], although Rousselle and Noël [47] did not observe any significant difference between groups with and without comorbid reading disorders. It appears therefore essential to assess the child's ability in a series of tasks such as: recalling number facts; applying calculation procedures [33]; reading and writing numbers; linking a number (written or orally presented) with the appropriate quantity of tokens [56]; processing and comparing numerosities [47]; counting [57]. It is also crucial to consider error types [58, 33, 24] and to evaluate the persistence of immature computation strategies (*e.g.*, long-term use of the fingers) [33, 29]. In addition, as some of the above-listed skills are supported by working memory [59- 62, 47], it could be critical to assess working memory skills too [27].

Conclusions

As for reading disability, based on the literature, it appears that word and non-word reading tasks highly correlate with each other and exhibit higher reliability and predictive value for diagnosis than passage reading tests. Therefore, it is recommended to use both word and non-word reading tests. Non-word reading tests are especially sensitive with dyslexic and/or compensated adults. Passage reading tests appear less reliable and more influenced by other abilities, however the experts highlight that text reading may be seen as a more ecological test with respect to the criterion of interference with daily life activities reported in the diagnostic manuals.

A3 Question. Which types of psychometric tests and which indexes should be used to assess reading, spelling and calculation disorders?
Focus 1. Types of tests

Recommendations

A3.1 For the diagnosis of dyslexia, it is recommended to use word and non-word reading tests, that are highly correlated to the disorder, and show higher reliability and predictability as compared to whole text reading.

A3.2 For the diagnosis of dyslexia in dyslexic and/or compensated adults, use of non-word reading tests is recommended for its relevance in this particular population.

A3.3 For the diagnosis of dyslexia, the use of a whole text reading test (including comprehension assessment) is recommended in order to evaluate interference of the learning disability with daily activities (as reported by the diagnostic manual ICD 10).

A3.4 For the diagnosis of dysorthography, the use of word and non- word dictation tests is recommended.

A3.5 For the diagnosis of dysorthography, the use of single word and text dictation is recommended, along with the production of written texts and sentences.

A3.6 For the diagnosis of dysorthography, assessment of different components according to educational stage is recommended, as specified below:
In early school years, assess grapheme-phoneme conversion processes.
During primary school, assess spelling at the lexical level, which is becoming progressively more important over time.
At the end of primary school, assess the presence of grapheme-phoneme conversion errors which, if found in this age range (the advanced stages of primary school), constitutes a marker of particularly severe disorders.

A3.7 For the diagnosis of dyscalculia, tests to assess specific skills (arithmetic facts, mastery of basic skills such as addition, subtraction, multiplication, reading and writing numbers; comparing numerosity; counting skills) are recommended.

A3.8 For the diagnosis of dyscalculia, use of standardized tests assessing memory and visual-spatial skills is further recommended, as these support and/or facilitate the acquisition and consolidation of arithmetic skills.

Conflict of interest statement

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this study.

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Appendix 1.
Diagnostic criteria according to ICD-10

F81 Specific developmental disorders of scholastic skills
F81.0 Specific reading disorder
A. Either (1) or (2):
(1) A score on reading accuracy and/or comprehension that is at least 2 standard errors of prediction below the level expected on the basis of the child's chronological age and general intelligence; with both reading skills and IQ assessed on an individually administered test standardized for the child's culture and educational system.
(2) A history of serious reading difficulties, or test scores that met criteria A (1) at an earlier age, plus a score on a spelling test that is at least 2 standard errors of prediction below the level expected on the basis of the child's chronological age and IQ.
B. The disturbance in A significantly interferes with academic achievement or activities of daily living that require reading skills.
C. Not directly due to a defect in visual or hearing acuity, or to a neurological disorder.
D. School experiences within the average expectable range (i.e. there have been no extreme inadequacies in educational experiences).
E. Most commonly used exclusion criterion: IQ below 70 on an individually administered standardized test.

F81.1 Specific spelling disorder
A. A score on a standardized spelling test that is at least 2 standard errors of prediction below the level expected on the basis of the child's chronological age and general intelligence.
B. Scores on reading accuracy and comprehension, and on arithmetic, that are within the normal range (+ 2 standard deviations from the mean).
C. No history of significant reading difficulties.
D. School experience within the average expectable range (i.e. there have been no extreme inadequacies in educational experiences).
E. Spelling difficulties present from the early stages of learning to spell.
F. The disturbance in A significantly interferes with academic achievement or activities of daily living that require spelling skills.
G. Most commonly used exclusion criterion: IQ below 70 on an individually administered standardized test.

F81.2 Specific disorder of arithmetical skills
A. A score on a standardized arithmetic test that is at least 2 standard errors of prediction below the level expected on the basis of the child's chronological age and general intelligence.
B. Scores on reading accuracy and comprehension, and on spelling that are within the normal range (+ 2 standard deviations from the mean).
C. No history of significant reading or spelling difficulties.
D. School experience within the average expectable range (i.e. there have been no extreme inadequacies in educational experience).
E. Arithmetic difficulties present from the early stages of learning arithmetic.
F. The disturbance in A significantly interferes with academic achievement or activities of daily living that require mathematical skills.
G. Most commonly used exclusion criterion: IQ below 70 on an individually administered standardized test.

Appendix 2.
Diagnostic criteria according to DSM-IV TR

Diagnostic criteria for 315.00 Reading Disorder
A. Reading achievement, as measured by individually administered standardized tests of reading accuracy or comprehension, is substantially below that expected given the person's chronological age, measured intelligence, and age-appropriate education.
B. The disturbance in Criterion A significantly interferes with academic achievement or activities of daily living that require reading skills.
C. If a sensory deficit is present, the reading difficulties are in excess of those usually associated with it.

Diagnostic criteria for 315.2 Disorder of Written Expression
A. Writing skills, as measured by individually administered standardized tests (or functional assessments of writing skills), are substantially below those expected given the person's chronological age, measured intelligence, and age-appropriate education.
B. The disturbance in Criterion A significantly interferes with academic achievement or activities of daily living that require the composition of written texts (e.g., writing grammatically correct sentences and organized paragraphs).
C. If a sensory deficit is present, the difficulties in writing skills are in excess of those usually associated with it.

Diagnostic criteria for 315.1 Mathematics Disorder
A. Mathematical ability, as measured by individually administered standardized tests, is substantially below that expected given the person's chronological age, measured intelligence, and age-appropriate education.
B. The disturbance in Criterion A significantly interferes with academic achievement or activities of daily living that require. mathematical ability.
C. If a sensory deficit is present, the difficulties in mathematical ability are in excess of those usually associated with it.

Appendix 3.
Proposed revisions for DSM-5 retrieved from APA site, 22 November 2010 (NB subsequently revised and changed) (www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=84#**)** specifically relating to the discrepancy criterion.

Proposed new criteria
Dyslexia

A. Difficulties in accuracy or fluency of reading that are not consistent with the person's chronological age, educational opportunities, or intellectual abilities.
Multiple sources of information are to be used to assess reading, one of which must be an individually administered, culturally appropriate, and psychometrically sound standardized measure of reading and reading-related abilities.
(…)
Rationale
• Name change to dyslexia consistent with international use.
• Wording needs to be consistent with the change in the U.S.'s reauthorized IDEA regulations (2004) which states that: "the criteria adopted by the State must not require the use of a severe discrepancy between intellectual ability and achievement for determining whether a child has a specific learning disability, as defined in 34 CFR 300.8(c)(10)."
• There is little evidence to support the DSM-IV criterion of a substantial discrepancy between achievement and intellectual ability (*e.g.*, Fletcher *et al.*, *J Learn Disabil* 1992; Vellutino *et al.* J Learn Disabil 2000; Siegel LS, *J Learn Disabil* 1989; Stanovich KE, *Learn Disabil Quarterly* 2005; Stuebing K [2002, meta-analysis] *Am Education Res Journal*).
• (…)

Appendix 4.
Proposed revisions for DSM-5 retrieved from APA site, 22 November 2010 (NB subsequently revised and changed) (www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=85#) specifically relating to the parameters to be considered

Proposed new criteria
Dyslexia
A. Difficulties in accuracy or fluency of reading that are not consistent with the person's chronological age, educational opportunities, or intellectual abilities.
Multiple sources of information are to be used to assess reading, one of which must be an individually administered, culturally appropriate, and psychometrically sound standardized measure of reading and reading-related abilities.
B. The disturbance in criterion A, without accommodations, significantly interferes with academic achievement or activities of daily living that require these reading skills.
Rationale
• (…)
• Reading fluency is included as a critical feature of reading acquisition: poor fluency is a key feature of dyslexia in adulthood; also poor fluency is a key feature of dyslexia in languages other than English (*e.g.*, Bashir & Hook, 2009 *Lang Speach Hear Services Sch*; Share DL, 2008 *Psychol Bull*; Shaywitz, SE *et al.* 2008 Annu Rev Psychol; Shaywitz *et al. Biol Psychiatry* 2003).
• Recommend that reading comprehension per se be omitted from DSM-5, because individuals who have specific reading comprehension problems in the presence of good decoding skills, do not meet criteria for dyslexia. Such individuals typically are found to have poor oral language (as in communication disorders). However, specific reading comprehension disorders could be coded under the newly proposed superordinate category of Learning Disability.
• (…)

Appendix 5.
"Specific Learning Disorder Fact Sheet" – final version of DSM-5 (retrieved from APA site, 2 august 2013) (www.dsm5.org/Documents/Specific Learning Disorder Fact Sheet.pdf) concerning "A 08: Specific Learning Disorder"

The upcoming fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) takes a different approach to learning disorders than previous editions of the manual by broadening the category to increase diagnostic accuracy and effectively target care. Specific learning disorder is now a single, overall diagnosis, incorporating deficits that impact academic achievement. Rather than limiting learning disorders to diagnoses particular to reading, mathematics and written expression, the criteria describe shortcomings in general academic skills and provide detailed specifiers for the areas of reading, mathematics, and written expression.

Characteristics of Specific Learning Disorder
Specific learning disorder is diagnosed through a clinical review of the individual's developmental, medical, educational, and family history, reports of test scores and teacher observations, and response to academic interventions. The diagnosis requires persistent difficulties in reading, writing, arithmetic, or mathematical reasoning skills during formal years of schooling. Symptoms may include inaccurate or slow and effortful reading, poor written expression that lacks clarity, difficulties remembering number facts, or inaccurate mathematical reasoning.
Current academic skills must be well below the average range of scores in culturally and linguistically appropriate tests of reading, writing, or mathematics. The individual's difficulties must not be better explained by developmental, neurological, sensory (vision or hearing), or motor disorders and must significantly interfere with academic achievement, occupational performance, or activities of daily living.

Because of the changes in DSM-5, clinicians will be able to make this diagnosis by identifying whether patients are unable to perform academically at a level appropriate to their intelligence and age. After a diagnosis, clinicians can provide greater detail into the type of deficit(s) that an individual has through the designated specifiers. Just as in DSM-IV, dyslexia will be included in the descriptive text of specific learning disorder. The DSM-5 Neurodevelopmental Work Group concluded that the many definitions of dyslexia and dyscalculia meant those terms would not be useful as disorder names or in the diagnostic criteria.

Broader Approach for Targeted Care
Broadening the diagnostic category reflects the latest scientific understanding of the condition. Specific symptoms, such as difficulty in reading, are just symptoms. And in many cases, one symptom points to a larger set of problems. These problems can have long-term impact on a person's ability to function because so many activities of daily living require a mastery of number facts, written words, and written expression.
Early identification and intervention are particularly important. The broader DSM-5 category of specific learning disorder ensures that fewer affected individuals will go unidentified, while the detailed specifiers will help clinicians effectively target services and treatment.