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Early identification and interventions for dyslexia: a contemporary view

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Abstract

This paper reviews current proposals concerning the definition of dyslexia and contrasts it with reading comprehension impairment. We then discuss methods for early identification and review evidence that teacher assessments and ratings may be valid screening tools. Finally, we argue that interventions should be theoretically motivated and evidence based. We conclude that early identification of children at risk of dyslexia followed by the implementation of intervention is a realistic aim for practitioners and policy-makers.

Keywords

Dyslexia; reading impairment; reading comprehension; early identification; intervention

Scientific research on dyslexia has burgeoned during the past 50 years, and a great deal is now known about its nature, aetiology and assessment. Against this backdrop, it should be possible for educators to recognise the signs which suggest that a child is at risk of reading failure. Such early identification should allow interventions to be implemented before a downward spiral of underachievement, lowered self-esteem and poor motivation sets in. This paper begins by reviewing the new proposals for the Diagnostic and Statistical Manual's (DSM-V) definition of dyslexia and proceeds to examine whether children with dyslexia and related literacy difficulties can be identified based on their response to good quality reading instruction. This aspiration was at the core of the recent independent review on dyslexia for UK government, conducted by Sir Jim Rose (2009). The review advocated a three-tier system beginning with high-quality mainstream teaching delivered to all, proceeding with adaptations and catch-up programmes for those 'at risk' and finally individualised teaching for those at greatest need. A growing evidence base of effective interventions suggests that this aim could become a reality.

Children's literacy difficulties

Dyslexia

Dyslexia is a neurodevelopmental disorder with a probable genetic basis, and it is generally agreed that more boys than girls are affected (although the gender ratio is higher in referred

samples). The core feature of dyslexia is a problem with word decoding, which in turn impacts spelling performance and the development of reading fluency. Dyslexia is persistent across the lifespan, and adult outcomes are variable; although some young people with dyslexia proceed to a university education, others leave school with minimal qualifications. Most adults with dyslexia complain of slow reading, problems of spelling and difficulties with written expression. In addition, problems with working memory, attention and organisation are frequently reported.

For many years, dyslexia was conceptualised as a specific reading difficulty affecting children for whom reading achievement was below that expected on the basis of a child's age and intelligence quotient (IQ). Gradually, this 'discrepancy definition' of dyslexia has fallen from use, and it is now recognised that dyslexia occurs across the IQ spectrum, although it needs to be borne in mind that, in terms of reading comprehension, those with higher IQ are likely to do better.

The predominant cognitive explanation of dyslexia is that it arises from a phonological deficit affecting the processing of speech sounds in words (see Vellutino et al., 2004 for a review). Early manifestations are difficulties with the development of phonological awareness and perhaps more so, problems of phonological learning (Carroll and Snowling, 2004). These in turn affect the acquisition of letter knowledge, one of the first signs that a child is at risk of reading problems. Problems with word recognition ensue together with phonological decoding deficits, seen most clearly when attempting to read novel words (Rack, Snowling and Olson, 1992). Problems with slow and inaccurate word reading can, in turn, be a bottleneck that impedes adequate reading comprehension.

The prevalence of dyslexia depends upon the precise definition and criteria that are used for its 'diagnosis' with estimates ranging from 3% to 10%. In a recent test standardisation, we collected data on the York Assessment of Reading and Comprehension [YARC; Snowling et al., 2009; Stothard et al., 2010; from a large sample (1553) of children aged 6–16 who were attending 50 state-funded primary and secondary schools in England]. Pupils were randomly selected according to their date of birth to ensure that the sample was representative of the schools concerned, and the schools were selected from different areas in an attempt to make the sample broadly representative of children in England. Because it is recognised that reading skills fall on a continuous dimension with no clear cut-off between 'normal' and 'impaired' (dyslexia) reading, we considered a number of different cut-off points for the classification of decoding difficulties/dyslexia (Stothard, Snowling and Hulme, in preparation). The YARC comprises tests of single-word reading, prose reading accuracy, reading rate and comprehension; here, we focus on the pupils who experienced moderate to severe levels of difficulty, as indexed by performance on the single-word reading test of 1.5 standard deviations (SDs) below the mean ($SS < 77.5$) and 2 SDs below the mean ($SS < 70$), respectively. Given that reading skills are normally distributed, around 7% of pupils are expected to have reading standard scores below 77.5 and 2% below 70.

Within the primary school sample, 10.5% of pupils obtained a standard score below 77.5 and 3.9% below 70 in single-word reading. In addition, 3.3% of sample showed a significant discrepancy between good reading comprehension (from the prose reading task) and poor

reading accuracy (16–41 standard score points), a profile sometimes associated with discrepancy-defined dyslexia. Within the secondary school sample, rates of reading impairment were similar as expected given the cut-offs and 4.9% of the sample showed a significant ‘discrepancy’ between decoding and reading comprehension.

More boys than girls were poor decoders in primary school, and the proportion of pupils with EAL was significantly higher among these children than in the remainder of the sample. Decoding difficulties were also more common among children from socially deprived areas. Together, these data remind us that social and cultural factors influence the prevalence of reading difficulties: dyslexia is more than a constitutional difficulty.

Problems of reading comprehension

Some children with dyslexia have problems with reading comprehension, which are attributable to slow and inaccurate word reading, leaving few attentional resources available for comprehension. However, reading comprehension impairment can occur in the absence of poor decoding, suggesting that it is a distinct disorder. Indeed, the profile of reading comprehension impairment contrasts markedly with dyslexia. These children (sometimes referred to as ‘poor comprehenders’) can decode and spell words accurately but have problems understanding the meaning of what they read. Poor comprehenders have been much less studied than children with dyslexia and the condition is not well recognised by teachers (see Hulme and Snowling, 2011 for a review). However, data from the YARC standardisation (discussed earlier) revealed that 5.3% of the primary sample and 5% of the secondary school sample could be defined as poor comprehenders. Reading comprehension impairment is therefore quite a common disorder that at present is a ‘hidden’ disability in the classroom setting.

Many children with reading comprehension impairment have wide-ranging oral language impairments coupled with good phonology; it is their intact phonological skills that account for their ability to decode. Prospective studies starting in the very early stages of learning to read suggest that children who go on to be poor comprehenders have weaknesses in basic language skills including vocabulary knowledge, grammar and syntax from an early age (Catts, Adlof and Ellis Weismer, 2006; Nation et al., 2010). Poor comprehenders also experience higher order language difficulties, including problems with inferencing and figurative language use as well as in text-related processes including comprehension monitoring and knowledge of story structure (Cain, 2010). Whether these are a cause or a consequence of their reading comprehension impairments remains debated, and there is considerable heterogeneity in the deficits shown by this group.

The distinction between dyslexia and reading comprehension impairment is consistent with the simple view of reading (Gough and Tunmer, 1986). According to the simple view, reading comprehension skill is the product of decoding and listening comprehension. Thus, there are three sorts of poor readers – those with poor decoding (dyslexia), those with poor listening comprehension (poor comprehenders) and those with impairments in both decoding and listening comprehension. Taking this view as a starting point, Bishop and Snowling (2004) reviewed a large body of literature on the relationship between reading and language impairments and proposed that to understand reading disorders, it is important to

take this two-dimensional view (see Figure 1). Further, children who enter school with poor phonology are at risk of decoding difficulties, while children with broader language impairments are at risk of reading comprehension difficulties. Children with clinically diagnosed specific language impairment generally have pervasive reading disorders with both processes affected.

In short, dyslexia is not a clear-cut diagnostic category. Rather, in keeping with other neurodevelopmental disorders that affect learning, it can be thought of as the behavioural outcome of a multiple risk factors, both genetic and environmental (Hulme and Snowling, 2009). It is also increasingly recognised that dyslexia co-occurs with other disorders; in particular, many children with dyslexia have language impairments (McArthur et al., 2000), symptoms of inattention (Carroll et al., 2005), attention deficit hyperactivity disorder (McGrath et al., 2011) and problems of motor coordination (Rochelle and Talcott, 2006). This nuanced view of dyslexia as a dimension that has continuities and comorbidities with other disorders has significant implications for contemporary theory and practice (see Snowling, 2009 for a review and access to related papers).

DSM-V proposals for the classification of learning disorders

The DSM of the American Psychiatric Association, currently in its fourth edition (DSM-IV; American Psychiatric Association, 1994) is a classification system of disorders of mental health in children and adults. It is the guide to US psychiatric practice and has a global influence on how disorders are diagnosed. However, because it is based on a medical model, there are tensions surrounding its use in education. Current proposals for the new edition of the manual (DSM-V) make significant changes to the way in which learning (and hence reading) disorders are classified (<http://www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=429>).

Within DSM-V, learning disorder is the generic term used to describe the disorders with onset in childhood, characterised by difficulties in learning, which significantly affect academic achievement. Learning disorders are grouped together with communication disorders (both are described as neurodevelopmental disorders) to reflect their early onset; they include dyslexia, dyscalculia and disorder of written expression. Reflecting the dimensional view, DSM-V drops the need for the individual to fulfil a discrepancy criterion, but it retains the possibility of using the term ‘dyslexia’ when an individual performs less well than expected – ‘not consistent with the person’s intellectual abilities’.

Thus, the proposed definition of dyslexia for DSM-V is:

1. 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 standardised measure of reading and reading-related abilities.
2. The disturbance in criterion A, without accommodations, significantly interferes with academic achievement or activities of daily living that require these reading

skills (<http://www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=84>).

It is worth discussing some of the features of the proposed diagnostic criteria from an educational perspective. First, it is noteworthy that the term dyslexia is used for the first time, and reading fluency is recognised as relevant to diagnosis; this is particularly important when assessing older pupils and adults. Second, a drawback is that there is no mention of spelling difficulty; rather this is to be considered under ‘disorder of written expression’. This strategy is potentially misleading because, in principle, poor spellers could be good at writing – indeed some are poets. Third, and most worryingly given our previous discussion, specific difficulties with reading comprehension (previously coded within reading disorder) are not recognised here. In fact, the ‘poor comprehender’ profile is briefly referred to as feature of language impairment. More generally, the apparent separation of learning and communication disorders downplays the overlap between reading and language impairments (Snowling and Hulme, 2012).

DSM-V has faced a number of theoretical issues concerning how best to diagnose developmental disorders, and the proposed form of classification has been questioned (Rutter, 2011). A key issue is the extent to which apparently different disorders might reflect the same underlying condition at different stages in development (Hulme and Snowling, 2009, ch. 9). This issue is brought into focus with regard to the relationship between learning and communication disorders. As discussed earlier, children with difficulties of language and communication are at high risk of literacy problems (Bishop and Snowling, 2004). Moreover, among children at risk of dyslexia, it is clear that poor oral language is a primary risk factor for reading failure (Snowling, Gallagher and Frith, 2003); on the other hand, intact language skills can provide a compensatory resource for children with word-level reading difficulties (Nation and Snowling, 1998). It falls to theoreticians and practitioners alike to recognise the interrelationships between spoken and written language if they are to be tuned to the continuities between delays and difficulties in oral language development and dyslexia – yet this is not mentioned in the proposed definition. Arguably, recognition of the overlap should set the agenda for early identification and intervention for reading and language disorders.

Early identification of children at risk of literacy problems

For many years, the importance of early identification and intervention for children with dyslexia has been stressed. Accordingly, much research has been directed towards establishing precursors of dyslexia in the preschool years in international studies of children at family risk of reading problems (e.g., Gallagher, Frith and Snowling, 2000; Lyytinen et al., 2006; McBride-Chang et al., 2008). Although significant progress has been made in identifying cognitive skills that predict literacy outcomes on a group basis (e.g., letter-sound knowledge and phoneme awareness; Muter et al., 2004), at the individual level, it is much harder to make accurate predictions (Puolakanaho et al., 2007). In this light, the merits of costly screening and assessment procedures must be questioned.

An alternative approach to screening and assessment pioneered in the US is ‘response to intervention’ (RTI; see Fletcher et al., 2007 for a review). This method, as its name suggests,

involves monitoring the progress of a group of children through a programme of intervention rather than undertaking a static assessment of their current skills. Children with the most need are those who fail to respond to effective teaching, and they are readily identified using this approach. Indeed, such a strategy was advocated by the Rose (2009) Review on identification and teaching of dyslexia and other literacy difficulties. Ideally, each child in wave 1 receives 'quality first' teaching in mainstream classes, perhaps adapted for the slower learners in the class. Following this, at wave 2, a small group or catch-up programme is offered and at wave 3, an individualised intervention. Within this approach, a child need not wait to fail sufficiently to fulfil diagnostic criteria but will be offered support as soon as they are dropping behind.

In the UK, at the time of writing, most children are recipients of a National Curriculum, and reading is taught using systematic phonics instruction. More importantly for present purposes, a considerable amount of data is routinely collected on individual children by teachers, schools and local authorities. An important question concerns whether these data be used to identify children 'at risk' of underachievement. We will discuss later findings from one local authority that suggest that this is indeed the case.

The validity of the Early Years Foundation Profile Stage (EYFS) to screen for language and literacy difficulties

In 2003, the assessment of children's progress at the end of the Foundation Stage (from 3 years to 5 years) was formally introduced into English schools. Subsequent to this, it became mandatory for all schools and early years providers to deliver a curriculum consistent with what was renamed the EYFS for children from birth to 5 years.

To investigate whether an assessment undertaken by teachers at the end of the EYFS (after children had been in school for 1 year) could provide a screening tool for the identification of children at risk of dyslexia, we investigated pupils' data from the EYFS profile (EYFSP) in one local education authority. Data were available from three cohorts of children entering all 50 maintained primary schools within the authority from September 2006 to July 2009. We have followed the progress of these children in acquiring literacy skills (Snowling et al., 2011; <http://www.education.gov.uk/publications/eOrderingDownload/DFE-RR172a.pdf>). Here, we focus on the data from the EYFSP and its relationship to later literacy attainments.

The EYFSP (Department of Children, Schools and Families, 2008a) comprised 13 scales within six areas of learning, each containing nine scale points. The areas of learning were personal, social and emotional; communication, language and literacy; problem solving, reasoning and numeracy; knowledge and understanding of the world; physical development; and creative development. On each scale, scale points 4–8 are the early learning goals, and scale point 9 describes the attainment of a child who is working consistently beyond early learning goals. Points 1–3 describe attainment below the early learning goals. The longitudinal data we collected included National Curriculum attainment levels at the end of Key Stage 1 (year 2), and language and literacy data from a representative sample of children followed up in year 3.

We first examined correlations between the EYFS measures and the Key Stage 1 Attainments, focusing on both the total score on the EYFSP and the more specific score for communication, language and literacy (CLL) total. At the end of Key Stage 1, teacher assessments are informed by statutory tasks and tests usually administered during May of year 2. The data analyses revealed moderate to strong correlations between EYFSP scores and Key Stage 1 attainments. More specifically, the score for CLL correlated strongly with performance 2 years later at the end of year 2 in reading (0.71) and writing (0.69) attainments. Our next question concerned how much of the differences (variance) in children's attainments at the end of Key Stage 1 was accounted for by the CLL scale of the EYFSP at the end of reception year. We found that about 50% of the differences between children in statutory assessments (at approximately age 7) could be accounted for by teachers' ratings of their CLL at the end of Early Years (around age 5) on the EYFSP.

These findings are promising and provide some validation for teacher ratings. However, a critic might argue that, as both EYFSP scale scores and Key Stage 1 assessments are based on teacher ratings, these are not as objective as would be desirable for identifying children whose literacy development is slow. Accordingly, we assessed a representative subsample of 360 of the children in year 3 on a battery of objective tests.

The tests given to assess literacy included a single-word reading test (inform the YARC; Snowling et al., 2009), a test of prose reading and comprehension (YARC; Snowling et al., 2009), and the British Ability Scales Spelling Scale (Elliott, Smith and McCullough, 1978). In addition to using individual measures in the analyses, we also formed a 'literacy' factor score from scores on all of the reading and spelling measures that provided a very reliable estimate of literacy skills in Year 3.

The findings of this follow-up study confirmed that the EYFSP score for CLL was a good predictor of later literacy attainments (slightly better than the EYFSP total score). Indeed, it showed moderate correlations with measures of reading, spelling and reading comprehension in year 3, and the correlation between children's CLL and the literacy factor was 0.59.

Together, these findings show that teacher assessment at 5 years, based on ongoing observation, provides a valid measure of children's current development and is a reasonable predictor of literacy attainments 2 years later. The findings underline the importance of the Early Years as providing a critical foundation for learning. They also provide evidence relevant to current proposals for the revision of the EYFS framework (Tickell, 2011, Review) by highlighting that key elements of development can be assessed at age 5; assessments at the end of Early Years can be used to identify children who are at high risk of educational difficulties; and the best predictors of educational success are measures of language, communication and literacy.

Screening for dyslexia using RTI

The findings from the EYFSP suggest that the risk of reading and writing difficulties are apparent early in development, and a screening tool targeting early language, literacy and communication skills has the potential to identify children who will go on to be dyslexic.

However, no screening tool is perfect, and hence it is important to include additional checks on children's development to reduce the probability of over- and underidentification of learning difficulties. In this regard, the RTI approach offers a useful adjunct to a screening tool as it involves monitoring the progress of children in receipt of a given curriculum.

Following the recommendation of Rose (2006), many primary schools in England implemented a systematic phonics approach to the teaching of reading. A large body of evidence suggests that such an approach is very effective for teaching children to read (National Reading Panel, 2000; Brooks et al., 2006). It follows that children who are finding reading difficult despite this quality approach are likely to be at risk of dyslexia.

The local authority with which we had worked for the EYFSP research had implemented a systematic phonics curriculum from 2006. Moreover, in line with policy recommendations, teachers were trained to track pupils' progress through a series of developmental phonic phases, with each phase being quantified by a number of phonic-related skills (Department of Children, Schools and Families, 2008b). The phases move from sensitivity to rhyme and alliteration at phase 1 to confident and fluent use of letter-sound knowledge (grapheme-phoneme correspondences) for reading and spelling unfamiliar words at phase 6. Because we had collected data from whole cohorts of children on a termly basis, we were able to use this to identify children who were 'failing to thrive' in terms of their phonics progress. We decided to carry this out when the children were about 6 years of age and had been in receipt of reading instruction for just over 1 year (Snowling et al., 2011).

Using school records, our criterion for 'dyslexia risk status' was taken to be 'not secure in phonic phase 2 at the end of the fourth term in school'. Phonic phase 2 requires the child to be able to provide the sound when shown any grapheme that has been taught – particularly being secure with the sounds of s, a, t, p, i and n; to select the correct grapheme to represent any of the 19 phonemes taught in this phase; and to blend and to segment CVC and VC words. Based on these criteria, 16.4% of the school population was assessed as 'behind expectation' in phonic skills. Because this is well above reported prevalence rates for dyslexia (typically 7–10%), it is clear that these judgments alone would over-identify children who subsequently go on to be 'free' of difficulty. However, to assess the validity of the teacher judgments, we proceeded to assess the same children at the end of year 1, some 6 months later, on objective tests of reading and related skills, comparing them with a representative sample of children from the same classrooms, matched on age and gender.

The findings of our study were clear: teachers were good judges of their pupil's progress, and their assessments predicted 50% of the variability in children's reading skills at the end of the school year (when considering this finding, it is important to bear in mind that objective test scores rarely produce better agreement over two points in time). However, a further question we wanted to address was whether these children could be described as dyslexic? To address this question, we turned to a working definition of dyslexia proposed by the expert advisory group serving the Rose (2009) review. This definition goes beyond that of DSM-V in describing the typical cognitive profile associated with the condition:

'Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling. Characteristic features of dyslexia

are difficulties in phonological awareness, verbal memory and verbal processing speed. (Rose, 2009, p. 9)

We proceeded to ask whether the group of children identified as ‘at risk’ showed the core characteristics of dyslexia – poor phonological awareness, poor verbal memory and slow verbal processing speed. This was indeed the case, and on tests of phoneme deletion, verbal working memory and rapid automatised naming, the children we identified showed impairments relative to their peers.

In summary, although there are many commercially available screening tests designed to identify ‘children at risk of dyslexia’, our findings suggest that there is no need to implement such costly procedures. There are already many data in schools that can be used by teachers to identify children who are failing to respond to mainstream teaching. A distinct advantage of teacher assessments is that they occur on a regular basis and can avoid delays in the implementation of good-quality evidence-based intervention. Ideally, school systems should embed such procedures in their policies and empower teachers to identify children with additional learning needs early (at the end of reception year or in year 1).

Interventions to ameliorate dyslexia

Early interventions at the foundations of literacy

We have seen that the RTI approach to assessment and intervention appears to hold promise for the early identification of children who are failing to learn to read at the expected rate. A further question is whether interventions can strengthen the foundations of literacy skills in children who show ‘at risk’ signs.

Bowyer-Crane et al. (2008) set out to address this question in a randomised controlled trial comparing two interventions designed for children who enter school with poorly developed language skills – the primary risk factors for poor literacy. Here, we will focus on the impact of the programme that targeted the development of decoding skills [phonology with reading programme (P + R)], comparing it with the alternative intervention that was designed to improve spoken language skills [oral language programme (OL)]. The programme comprised training in letter-sound knowledge, segmenting and blending and reading from texts, which were selected to be at the appropriate level following the administration of a ‘running record’. It was delivered each day for 20 weeks to children in reception and year 1 classes by trained teaching assistants, alternating between small group and individual teaching sessions (see Carroll et al., 2011 for details of both programmes).

We found that the children who received the P + R programme did significantly better than those who received the OL programme on tests of phoneme awareness, letter-sound knowledge and reading and spelling skills at the end of the intervention. The gains were maintained after the intervention had stopped. Furthermore, it appeared that the P + R intervention programme had ‘lifted’ many of the children from the ‘at risk’ to the typical range of reading skills for their age such that, while 68.1% of the OL group remained at risk for literacy difficulties, this was only the case for 50% of the P + R group. In fact, 7.1% of children in the P + R group now had above average reading scores.

Of course, no intervention programme benefits all children, and inevitably there is variation in children's response. We found that one factor which predicted progress was nonverbal IQ, such that children with more specific language impairment tended to do better than children with general language delay (Bowyer-Crane et al., in press). However, our sample size was small for exploring predictors of response, and it is important at this stage to be cautious about such findings.

Treating dyslexia

Beyond the early years, there are now many evidence-based interventions for children with reading difficulties/dyslexia (Duff and Clarke, 2011; Fletcher et al., 2007; Snowling and Hulme, 2011). A good starting point for developing an intervention is understanding the causes of a disorder. Indeed, targeting of impaired processes provides the theoretical motivation for the design and content of an intervention. Unfortunately, the field of dyslexia is plagued with supposed 'cures' that have no proper evidence base. It is therefore important for professionals to critically review the content of available programmes to ensure their suitability. A useful website developed to complement the Rose Review is <http://www.interventionsforliteracy.org.uk/schools/>.

However, to choose an effective programme or approach, what professionals require is good understanding of the principles of interventions and their suitability for different children. Snowling and Hulme (2011) reviewed the ingredients of evidence-based interventions for language and literacy difficulties. They concluded that it is a good practice to ensure that interventions are systematic, well structured and multi-sensory, and that they incorporate direct teaching, learning and time for consolidation, with frequent revision to take account of the likely limited attention and learning difficulties of the child. For dyslexia, effective interventions should include training in letter sounds, phoneme awareness, and linking letters and phonemes through writing and reading from texts at the appropriate level to reinforce emergent skills. In contrast, poor comprehenders require a different 'diet' attuned to their needs and can benefit from training in oral language skills particularly vocabulary training (Clarke et al., 2010: <http://readingformeaning.co.uk/>). Of course, it is important to bear in mind that many children will have problems with decoding and comprehension, in which case a mixed approach is needed.

More generally, there is still typically too long a lag between the identification of children's reading difficulties and the implementation of interventions. It is also the case that many interventions are short and do not take account of the ongoing needs of children who have dyslexia. Given this, there is an urgent need for the evaluation of approaches to the education of children with special education needs who receive school-based intervention programmes.

Conclusions

As knowledge of dyslexia and related difficulties has increased, not only in readers of English but also other languages (Caravolas, 2005), there remains a pressing need for theory to influence practice. This paper has attempted to demonstrate how an understanding of dyslexia can be used to ensure that children in our school systems who are at risk of dyslexia

can be identified early before a sense of failure sets in. The emphasis has been on dyslexia as a dimensional disorder rather than a discrete diagnostic category. Finally, evidence showing that children with dyslexic difficulties can be helped by specific interventions underlines the need for timely action rather than waiting for diagnosis.

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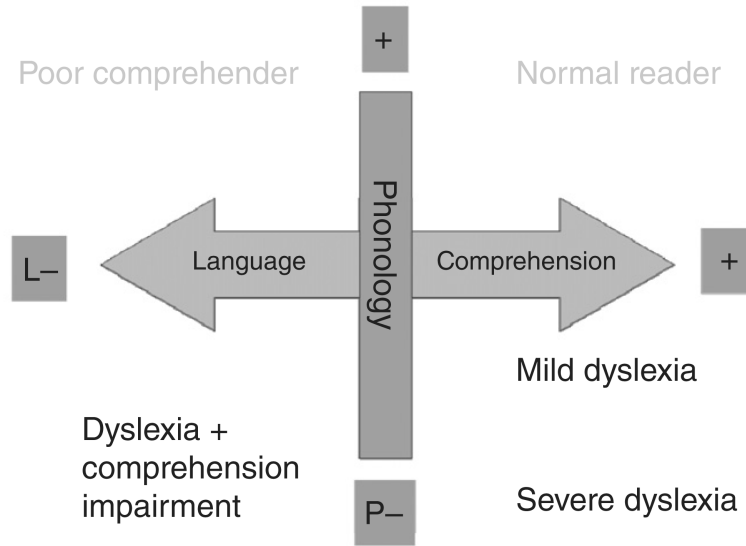


Figure 1. Two-dimensional model of the relationship between language and reading impairments (after Bishop and Snowling, 2004)