Early identification of dyslexia: Understanding the issues

Danielle Colenbrander[1], Jessie Ricketts[2] and Helen L. Breadmore[3]

[1]School of Experimental Psychology, University of Bristol, Bristol, United Kingdom

[2]Department of Psychology, Royal Holloway University of London, Egham, United Kingdom

[3]Centre for Advances in Behavioural Science, Coventry University, Coventry, United Kingdom

Purpose

To provide an overview of the benefits and challenges associated with the early identification of dyslexia.

Method

The literature on the early identification of dyslexia is reviewed. Theoretical arguments and research evidence are summarised. An overview of Response to Intervention as a method of early identification is provided and the benefits and challenges associated with it are discussed. Finally, the role of speech language pathologists in the early identification process is addressed.

Conclusions

Early identification of dyslexia is crucial to ensure that children are able to maximise their educational potential, and speech language pathologists are well placed to play a role in this process. However, early identification alone is not sufficient – difficulties with reading may persist or become apparent later in schooling. Therefore, continuing progress monitoring and access to suitable intervention programs is essential.

Early Identification of Dyslexia: Understanding the Issues

Functional reading and writing abilities are essential for full participation in society. The inability to read accurately and fluently has many negative consequences, including poor educational outcomes (McLaughlin, Speirs, & Shenassa, 2014; Ricketts, Sperring, & Nation, 2014), reduced occupational choices and lower levels of employment (McLaughlin et al., 2014; OECD, 2013), poor self-esteem and poor mental and physical health (Boetsch, Green, & Pennington, 1996; Dewalt, Berkman, Sheridan, Lohr, & Pignone, 2004). Unfortunately, there is evidence that children who begin schooling with poor reading abilities either continue to be behind their peers years later, or fall even further behind in a "rich get richer" effect known as the Matthew effect (Ferrer et al., 2015; Stanovich, 1986). This is likely to be because children who are poor readers may have less exposure to written text, which not only hinders the development of fluency and automaticity but also limits exposure to more advanced vocabulary and grammar. As a result, children's reading comprehension and ability to learn from what they read is reduced (A. E. Cunningham & Stanovich, 1998; Mol & Bus, 2011).

To prevent such consequences, it is essential to be able to accurately identify reading difficulties as early as possible, so that children can be provided with the intervention they need. This is even more crucial in the face of evidence that effective early schooling has benefits which are apparent more than a decade later (Tymms, Merrell, & Bailey, 2017), and some types of intervention may be most effective when delivered early in the school years (Catts, Nielsen, Bridges, Liu, & Bontempo, 2015; Dion, Brodeur, Gosselin, Campeau, & Fuchs, 2010; Scanlon, Vellutino, Small, Fanuele, & Sweeney, 2005). Furthermore, intervention later in schooling is both more expensive and resource-intensive than intervention early in schooling (Fuchs, 2003; Pfeiffer et al., 2001; Wanzek & Vaughn, 2007).

Aims

In this tutorial, we summarise existing research and theoretical debates about early identification of reading difficulties with the needs of practitioners in mind. The literature in this area is extensive and it is beyond the scope of this article to provide an exhaustive review. Rather, we aim to provide sufficient information to allow speech language pathologists (SLPs) and other professionals who work with young children to play an informed role in the early identification process. Specifically, we will address the following questions:

1) What are the key issues with early identification of reading difficulties?
    a. How should we define dyslexia and other reading difficulties?
    b. How do we decide whether or not a child has a reading difficulty?
    c. What risk factors are associated with development of reading difficulties?
    d. Can knowledge of risk factors support early identification of reading difficulties?
2) How can early identification be implemented? What role can SLPs play?
3) What are the limitations of early identification?

Key issues with early identification of reading difficulties

How should we define dyslexia and other reading difficulties?

The Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) provides a useful framework for understanding why children might struggle to comprehend what they read. According to the Simple View, reading comprehension skill is the product of word reading abilities (decoding and word recognition abilities) and language comprehension abilities. Deficits in one or both of these areas will result in different profiles of reading difficulty that require different forms of intervention.

Within this conceptualisation, the term “dyslexia” is reserved for children who have poor word reading abilities despite age-appropriate language comprehension skills. Children

with weaknesses in both word reading and language comprehension are referred to as "generally poor readers". Children with age-appropriate word reading abilities and poor oral language are referred to as "poor comprehenders". These children are able to read words without difficulty, but have impaired reading and listening comprehension because of their oral language difficulties.

In the DSM-5 (American Psychiatric Association, 2013), diagnostic criteria for dyslexia (also known as "specific learning disability with impairment in reading") are more specific. In the DSM-5, dyslexia is defined as a neurodevelopmental disorder characterised by impairments in decoding, word reading accuracy and fluency, and spelling. A diagnosis of dyslexia can only be made if difficulties have persisted for at least 6 months despite adequate intervention, and cannot be accounted for by a range of related factors, such as intellectual disabilities, psychosocial adversity or inadequate instruction.

In this tutorial, we focus on identifying children with word reading difficulties[1]. This includes children with dyslexia under the DSM-5 definition, but also includes those that do not meet DSM-5 criteria, and those who have additional difficulties (such as generally poor readers). In our view, any child whose word reading skills are not adequate for their age should be entitled to appropriate intervention. There is a need for intervention regardless of whether difficulties are due to (or comorbid with) neurodevelopmental issues, socioeconomic factors, inadequate early instruction, or other relevant factors such as weak oral language skills or limited exposure to English. However, this is not to say that knowledge about causes or comorbidities is unimportant. Such knowledge can be crucial for informing choices about the nature and intensity of intervention (e.g. see Al Otaiba, Rouse & Baker, this issue).

Our specific focus is on the identification of word reading difficulties at the very beginning of reading instruction – pre-school and the first two years of formal education.

[1] For discussion of issues associated with identifying poor comprehenders, see Cain & Oakhill, 2006; Clarke, Henderson, & Truelove, 2010; Keenan et al., 2014

Note that spelling is closely associated with word reading difficulties and often results from impairments in similar underlying skills. However, spelling may need specific attention and targeted intervention (for discussion of these issues see Caravolas, Hulme, & Snowling, 2001; Kohnen, Nickels & Castles, 2009; Vellutino, Fletcher, Snowling, & Scanlon, 2004).

How do we decide whether or not a child has a reading difficulty?

The success of early intervention relies heavily on the methods of identifying the children who are at risk of literacy difficulties. These methods need to be specific and sensitive. They need to be specific enough to ensure that the process does not result in over-identification of children who are not genuinely at risk. Misdiagnosis may result in unnecessary worry and stress for parents or caregivers, stigma from being labelled as impaired, and wasted time and money (Catts, 2017). Crucially though, identification methods must be sensitive enough to detect all children who are at risk of developing reading difficulties: the consequences of missing children who are at risk are serious and long-term.

Reading is a complex task which draws on a wide range of knowledge and skills, and reading abilities fall along a continuum. There is no objective cut-off point below which all children are poor readers and above which all children are good readers (Bishop, 2015; Snowling, 2013). In practice, however, time and financial considerations may demand use of a defined cut-off to determine which children receive additional support and intervention. Within the research literature, word reading difficulties are commonly operationalised as performance in the lowest 16% or 25% of the population (equivalent to a standard score below 85 or 90). In clinical and educational settings, cut-offs may vary widely. The choice of cut-off is crucial – it will influence the sensitivity and specificity of identification methods, and should be driven by research on optimal criteria in particular populations (Catts, 2017; O'Connor & Jenkins, 1999; Speece, 2005).

Furthermore, children's skills develop rapidly due to both maturation and schooling, and different methods of identification will be more sensitive at different stages (Cunningham & Carroll, 2011; Speece, 2005; Thompson et al., 2015). Once children begin reading instruction, their progress can be assessed on curriculum-relevant reading measures (we discuss this in further detail in the sections on implementation of early identification). However, before children begin formal instruction, reliable measurement of reading skills can be difficult or even impossible. Therefore in the pre-school years in particular, it is important to consider broader reading-related skills and risk factors when attempting to determine the likelihood of future reading difficulties (Pennington et al., 2012). We discuss such factors below.

What risk factors are associated with the development of word reading difficulties?

There is no single risk factor which is reliably associated with the later development of reading difficulties. Reading difficulties are the product of a complex mixture of genetic, environmental, cognitive and non-cognitive risk factors which interact with each other, and may vary across individuals. Children at risk are best identified on the basis of multiple, probabilistic difficulties (Carroll, Mundy, & Cunningham, 2014; Pennington et al., 2012; Thompson et al., 2015).

Some risk factors are likely to be directly and causally related to word reading, such as difficulties in underlying cognitive skills. Other factors are more likely to have an indirect effect on literacy acquisition, and some of these factors may be more open to intervention than others. Either way, the greater the number and severity of risk factors, the more likely the individual is to develop word reading difficulties (Snowling, 2008). Below we discuss a number of risk factors which may be key early indicators of the future development of reading difficulties.

Genetic factors

There is strong evidence that reading difficulties are heritable; children with a family member who has a reading difficulty are more likely to go on to develop reading difficulties than children with no family history (Pennington & Lefly, 2001; Scarborough, 1990; Snowling, Gallagher, & Frith, 2003; Thompson et al., 2015). Of children who have a first degree relative with reading difficulties, 40-66% will go on to develop reading difficulties themselves, as compared with 6-14% of those who do not have a family member with reading difficulties (Catts, 2017; Pennington & Lefly, 2001; Scarborough, 1990; Snowling et al., 2003). Therefore, there are strong reasons to consider family history, and monitor the development of reading amongst relatives of those with literacy difficulties.

Oral language skills

Weak oral language skills at the time of learning to read are associated with a high risk of developing future reading difficulties (Catts, Fey, Tomblin, & Xhang, 2002; Snowling, 2014; Snowling, Duff, Nash, & Hulme, 2016; Thompson et al., 2015). Conversely, there is some indication that good oral language skills may act as a protective factor. Children at family risk of reading difficulties who have age-appropriate oral language skills are less likely to develop reading difficulties, perhaps because they are able to use these relative strengths in oral language to compensate for other weaknesses (Snowling et al., 2003; Snowling, 2008). Below, we focus on impairments in phonological skills, vocabulary knowledge and morphological awareness as risk factors for the developmental of word reading difficulties. We also consider the impact of speech and hearing difficulties.

Phonological skills and letter knowledge

At the beginning stages of learning to read and spell an alphabetic language like English, children must learn how letters relate to sounds. They can then start to blend sounds together to pronounce words and segment sounds to spell words. This knowledge of letter-

sound mappings, blending and segmenting is often referred to as phonics. Once children have phonic skills, they have many of the building blocks needed to develop a memory store of word spellings and pronunciations. For example, as Share (1995) argues in the self-teaching hypothesis, once children can decode or blend for reading, they can teach themselves to read words that they have never seen.

Knowledge of phonology is central to successful phonics and early word reading. Indeed, weaknesses in phonological processing are strongly associated with difficulties in decoding, word reading and spelling (Carroll et al., 2014; Melby-Lervag, Lyster, & Hulme, 2012; Snowling et al., 2003). Tasks tapping the ability to manipulate and make judgements about units of sound at the phoneme level (phonemic awareness) are particularly strong predictors of future reading abilities (Melby-Lervag et al., 2012). In many studies, phonemic awareness is the strongest single predictor of word reading difficulties (e.g. Pennington et al., 2012; Snowling, 2000), although prediction is more accurate when other relevant factors are also taken into account, and phonological difficulties alone are not always sufficient to cause dyslexia (Carroll, Solity, & Shapiro, 2016; Pennington et al., 2012; Snowling, 2008, 2014). Evidence from longitudinal and training studies suggests that there is a causal relationship between phonemic awareness and reading abilities (e.g. Melby-Lervag et al., 2012). This relationship is likely to be reciprocal, in that learning to read also leads to better phonemic awareness (Caravolas et al., 2001; Castles & Coltheart, 2004; Melby-Lervag et al., 2012).

Letter knowledge is another strong predictor of future word reading and spelling abilities (e.g. Caravolas et al., 2001; Pennington & Lefly, 2001; Thompson et al., 2015). Knowledge of letter names and/or sounds plays a crucial role in the learning of grapheme-phoneme correspondences, alongside phonemic knowledge. As with phonemic awareness, there is evidence from both longitudinal and training studies that letter knowledge may be causally related to later reading abilities (Hulme & Snowling, 2014).

Vocabulary knowledge

Poor oral vocabulary knowledge is strongly linked to poor reading comprehension (Elwer, Keenan, Olson, Byrne, & Samuelsson, 2013; Nation, Snowling, & Clarke, 2007). Logically, a child must be able to understand all of the words in a given text in order to fully understand it. Less well-understood is the role that oral vocabulary knowledge plays in word reading. There are two complementary hypotheses about the nature of this link. Firstly, good vocabulary knowledge allows children to correct their partial decoding attempts (Dyson, Best, Solity, & Hulme, 2017; Share, 1995; Tunmer & Chapman, 2012). For example, a child who sounds out the word "deaf" as /deef/ may be able to guess the correct pronunciation of the word because it is the closest pronunciation in their spoken vocabulary. Secondly, good vocabulary skills may influence word reading via its effects on phonological processing. The Lexical Restructuring Model (Metsala & Whalley, 1998; Walley, Metsala, & Garlock, 2003) proposes that growth in oral vocabulary results in more detailed specification of phonology. More precise phonological representation can then better support word reading development (see above). There is mixed evidence for this model (e.g. see Goodrich & Lonigan, 2014; Lerner & Lonigan, 2016).

Despite these claims, longitudinal research shows that an individual child's oral vocabulary knowledge in pre-school or in the first year of formal schooling is not a reliable predictor of their later word reading abilities (Duff, Reen, Plunkett, & Nation, 2015; Muter, Hulme, Snowling, & Stevenson, 2004). However, vocabulary knowledge measured in the later elementary years does predict word and irregular word reading ability (Nation & Snowling, 2004; Ricketts, Nation, & Bishop, 2007), and a recent study found that six-year-old children's ability to read regular and irregular words was related to their knowledge of the words' meanings (Ricketts, Davies, Masterson, Stuart, & Duff, 2016). Furthermore, in a training study, Wang, Nickels, Nation, & Castles (2013) found that children were better at

learning to read novel irregularly spelled words when they knew the meanings of the words. Thus, it is worth monitoring the reading abilities of children with weak vocabulary skills, particularly if weak vocabulary skills are accompanied by other risk factors associated with reading difficulties.

Morphological awareness

Because English is morphophonemic, the correct spelling of a word is determined by a combination of phonological, morphological and orthographic factors. For example, choosing the correct spelling of the homophone "missed" relies on knowledge about past tenses. Knowledge about morphology not only supports accurate spelling, but also facilitates access to meaning; morphological skills enable children to infer the meaning of newly encountered words that are not in their vocabulary, provided they know something about the constituent morphemes. Morphological awareness is associated with word reading, spelling and reading comprehension, after accounting for the contribution of phonology and vocabulary (Deacon, Benere, & Pasquarella, 2013; Deacon, Tong, & Francis, 2017).

Children with dyslexia tend to show weak or atypical morphological skills (Breadmore & Carroll, 2016a, 2016b; Carroll & Breadmore, 2017; Joanisse, Manis, Keating, & Seidenberg, 2000). There is some debate about when morphological skills become important for literacy, with classic theories arguing that children initially focus on phonology (e.g., Ehri, 1995; Gentry, 1982), while more recent statistical learning frameworks suggest that children use their knowledge of morphology from the beginning of development (Deacon, Conrad, & Pacton, 2008; Treiman, 2017). Increasing evidence suggests that although the impact of morphological skills develops throughout childhood, morphology may have a key role in reading and spelling from the beginning (e.g., Breadmore & Deacon, under review; Pacton & Deacon, 2008).

There is evidence that instruction in morphological principles leads to improved reading and spelling (P. N. Bowers, Kirby, & Deacon, 2010), suggesting that morphological knowledge may play a causal role in reading development. However, there is fierce debate surrounding the question of whether early reading instruction should involve instruction in morphology (e.g. see Bowers & Bowers, 2017; Rastle, 2018). To date, the debate is largely theoretical as very few empirical studies have directly explored this question. Nonetheless, children who have weak morphological skills may be at risk of reading and spelling difficulties.

Hearing difficulties

Hearing is a key risk factor to consider in early identification of word reading difficulties. Deafness and hearing loss can affect the nature and quality of exposure to spoken language. This impacts on oral language skills (particularly phonological skills and vocabulary) which in turn affect reading. Profoundly and severely deaf children are at significantly greater risk of literacy difficulties than hearing children. While there is wide individual variation, the literacy difficulties that are common amongst the deaf population are often very severe. By the end of elementary school, deaf children are already on average three years behind in reading. The gap between them and their hearing peers increases, with deaf children making a third of the progress that is expected each year (Herman, Roy, & Kyle, 2014; Kyle & Harris, 2010). Nonetheless, phonological awareness, vocabulary and other (signed and spoken) language skills predict literacy attainment for deaf children (Kyle, Campbell, & MacSweeney, 2016; Mayberry, del Giudice, & Lieberman, 2011).

It is not only severely and profoundly deaf children who are at greater risk of literacy difficulties. Children with mild-to-moderate or unilateral deafness, and also those with a history of fluctuating hearing loss due to glue ear (repeated middle ear infections also known as otitis media with effusion) are also at greater risk of reading difficulties than hearing

children (Carroll & Breadmore, 2018). Children with mild-to-moderate or fluctuating hearing loss are not at as high risk of vocabulary and language difficulties as those with severe and profound deafness. Their difficulties appear to be more specific to phonology (Carroll & Breadmore, 2018). Nonetheless, one should consider all levels of permanent and temporary hearing loss to be risk factors for reading difficulties. It is, however, still crucial to consider the individual child's pattern of strengths and weaknesses in literacy related cognitive skills (e.g., phonological and morphological awareness, vocabulary) to evaluate the level of risk and provide appropriate intervention.

Speech sound disorders

Children with speech sound disorders – persistent difficulties with speech production not due to sensory, motor or other physical conditions (American Psychiatric Association, 2013) – are also at an increased risk of developing reading difficulties, but the relationship is complex. A recent study (Hayiou-Thomas, Carroll, Leavett, Hulme, & Snowling, 2017) found that children who had speech sound disorders that persisted until school entry had a small but significant risk of phonemic awareness and spelling difficulties, which attenuated over time. The risk of reading and spelling difficulties was far greater for children with speech-sound disorders who had co-occurring language difficulties and/or a family history of reading difficulties, with each factor adding cumulatively to risk (Hayiou-Thomas et al., 2017).

Other cognitive factors

A range of other cognitive factors have been associated with reading abilities such as rapid automatic naming (RAN; e.g. Wolf & Bowers, 1999), short term memory, working memory and executive functions (e.g. Alloway & Alloway, 2010; Gathercole, Alloway, Willis, & Adams, 2006; St Clair-Thompson & Gathercole, 2006). RAN in particular is a powerful predictor of future reading achievement (e.g. Caravolas et al., 2012; Manis,

Seidenberg, & Doi, 1999). However, the evidence for causal relationships between these skills and word reading is equivocal, and programmes training these broader cognitive skills have not been effective in improving reading abilities (e.g. see Banales, Kohnen, & McArthur, 2015; Jacob & Parkinson, 2015; Kirby et al., 2010; Melby-Lervag & Hulme, 2013; Melby-Lervag et al., 2012). Therefore, we do not discuss these risk factors in further detail.

Can risk factors support early identification of word reading difficulties?

As discussed above, no individual risk factor is a suitably sensitive or specific predictor of reading difficulties on its own, and there is no single cause for word reading difficulties. Consistent with this, children with word reading difficulties are a heterogeneous population and may have various underlying patterns of impairment (Carroll et al., 2016; McArthur et al., 2013; Pennington et al., 2012). To complicate matters even further, the role played by different risk factors changes over time, and what is a strong indicator of future word reading difficulties at a very young age may not be the best indicator at a later age (O'Connor & Jenkins, 1999; Speece, 2005; Thompson et al., 2015). Thus, it is not possible to recommend a single risk factor or assessment which is capable of identifying all children who will develop word reading difficulties. Rather, the presence and severity of individual risk factors should be seen as warning signs indicating that a child's emergent and developing literacy should be monitored. We now discuss ways in which this monitoring can be carried out.

How can early identification be implemented?

At present, the most widely-researched framework for carrying out early identification is Response to Intervention (Fuchs & Fuchs, 2006; Fuchs, Fuchs, & Speece, 2002). Response to Intervention (RTI) is a system which utilises multiple tiers of instruction and assessment to determine which children need additional reading support. Typically, it consists of three tiers of instruction (Gersten et al., 2009). The first tier involves effective

evidence-based initial reading instruction, delivered to all students in regular classrooms. Children's progress is monitored regularly using curriculum-relevant assessments. Successful response to instruction is defined as making a pre-determined amount of progress or reaching pre-determined standards on a particular assessment task. In this way, the first stage of identification is focused on the functional consequence of a reading difficulty rather than its cause. Children who do not meet pre-determined criteria go on to the second tier of instruction. They receive additional support, which may involve more explicit or frequent instruction, or instruction in smaller groups. Their progress continues to be monitored regularly, and if these children continue to fail to meet required standards, they may be referred for in-depth assessment and/or special education services to meet their specific needs.

A major advantage of this method is that it does not involve "waiting to fail" (Fletcher, Coulter, Reschly, & Vaughn, 2004; Fuchs & Fuchs, 2006). Children's progress is monitored right from the beginning of reading instruction, which means that problems can be identified and addressed early on. Furthermore, the emphasis on high quality, evidence-based initial instruction means that successful implementations of RTI should reduce the number of "instructional casualties", or children who fail to learn to read due to inadequate instruction (Fletcher et al., 2004). However, RTI methods are subject to the same complexities associated with any method of early identification. Success relies on the methods of instruction selected for each tier but also on the choice of appropriate criteria for growth and achievement in reading abilities, as well as on the choice of sensitive, specific and reliable assessments (e.g. Catts et al., 2015; Fletcher & Vaughn, 2009; Fuchs & Fuchs, 2006). RTI has been implemented differently, and with varying degrees of success, across different contexts. Below, we briefly discuss the research on issues of implementation within the US context, where RTI methods were first conceptualised. We then discuss implementation of a

closely related early identification framework in England, where implementation has been mandated at a national level.

Response to Intervention in the US

In the US, RTI has formed a key part of national recommendations for identification and remediation of learning difficulties since 2004 (Arden, Gruner Gandhi, Zumeta Edmonds, & Danielson, 2017; Gersten et al., 2009; IDEA 2004). Decisions about when and how to implement RTI are left to individual states and local education agencies. A number of research studies have provided support for the effectiveness of RTI methods (e.g. see Burns, Appleton, & Stehouwer, 2005; Gersten, Newman-Gonchar, Haymond, & Dimino, 2017), however the results of a recent large-scale, national evaluation of RTI were less positive.

The Evaluation of Response to Intervention Practices for Elementary School Reading (Balu et al., 2015) consisted of an impact study involving 146 elementary schools that had implemented RTI for at least three years at the time of the evaluation, and a descriptive analysis based on survey (self-report) data from 1300 randomly selected schools. The impact study used a regression continuity design to compare the reading outcomes of children above and below each school's designated cut-point score for access to Tier 2 intervention. Schools used a variety of different screening assessments and cut points. The results were not promising – in Grade 1, children scoring below the cut-point (i.e., those eligible for intervention) scored more poorly on reading outcomes than children above the cut-point, and there was no significant difference between the groups in Grades 2 and 3 (Balu et al., 2015).

The results of the impact study seem to imply that RTI was ineffective, however a number of critiques have been made. Firstly, there is evidence to suggest that not all students below the cut-point actually received Tier 2 intervention, while some students above the cut-point did. In other words, the results of the study do not necessarily reflect a comparison of those receiving intervention versus those not receiving intervention, and suggest that RTI was

not always implemented appropriately (Fuchs & Fuchs, 2017; Gersten, Jayanthi, & Dimino, 2017). Secondly, cut-points at some schools were extremely high, with 41% of students on average receiving Tier 2 intervention (Balu et al., 2015). In other words, some students may have been receiving instruction that was not appropriate for their skill level. Thus, the results of the evaluation should not be taken as evidence that RTI does not work – rather, it should be taken as evidence that RTI did not benefit children whose scores fell just below their school's cut-off point (Gersten, Jayanthi, et al., 2017).

More positive evidence for the effectiveness of RTI has come from smaller-scale controlled trials, but these have tended to involve large amounts of support, training and monitoring by experts (Gersten, Jayanthi, et al., 2017; Gersten, Newman-Gonchar, et al., 2017). This suggests that it may be beneficial to devote more resources to training and implementation monitoring at the school level (Arden et al., 2017; Gersten, Jayanthi, et al., 2017). However, before resources are diverted in this way, far more research is needed on the details of implementation – which assessments are most sensitive, which intervention methods are most effective, and how best to ensure that Tier 1 and Tier 2 instruction methods are complementary. Care will also need to be taken to specify the contexts in which particular methods of RTI implementation are most effective – different settings may require different approaches. With this in mind, we now consider how the principles of RTI have been adapted and implemented in a very different education system.

Early identification in England

In England, requirements for educational providers are set by law and monitored by the Department for Education at the national level. These requirements include guidance for both curriculum and regular assessment. Systematic synthetic phonics is mandated as the compulsory method of initial reading instruction. Statutory assessments of literacy skills are regular, but are not the only way in which children's reading difficulties are identified.

Teachers refer children to Educational Psychologists or dyslexia specialists for formal assessment when they have significant concerns (see Carroll et al., 2017). However, statutory assessments do provide a framework to monitor all children's progress, helping to ensure that children with emerging literacy difficulties receive additional support.

Children begin formal schooling at a relatively young age: the September after their fourth birthday. The first year of formal schooling is known as Reception. At the end of Reception, an observational assessment known as the Early Years Foundation Stage Profile (Department for Education, 2014) is completed by the child's teacher, in consultation with parents or carers and any other relevant adults. Teacher judgements are both internally and externally moderated for consistency and accuracy. The EYFS Profile indicates a child's level of development against early learning goals. The EYFS Profile is given to each child's parents and Year 1 teacher alongside a commentary to inform them about a child's learning and development needs. Such information is expected to assist with planning of Year 1 activities and contribute to a smooth transition from the more play-focused Reception year to the more formal Year 1.

There is research to support the validity of the EYFS Profile. Snowling (2013) found that attainment on the literacy and communication and language aspects of the EYFS Profile was highly correlated with teacher measurements of reading and writing performance at the end of Year 2, and with standardised tests of reading, spelling and reading comprehension in Year 3. However, there are also problems with the EYFS profile. Some feel that it places a heavy administrative burden on teachers, and although the results of the profile can point to the existence of difficulties in reading and writing, there is no clear guidance on how this information should be acted upon (Ofsted, 2017; Ward, 2017). Currently, the Department for Education is planning to improve the EYFS profile, and a baseline assessment at entry to Reception is under consideration.

After Reception, statutory assessments include a Phonics Screening Check at the end of Year 1, followed by tests of English Grammar, Punctuation and Spelling, and English Reading (which focuses on reading comprehension, rather than word reading) at the end of Year 2 (Standards and Testing Agency, 2017a). The Phonics Screening Check is most relevant to word reading (Standards and Testing Agency, 2017b). Here, children complete a brief assessment with their Class Teacher during which they are required to read 40 words and nonwords. Nonwords are used because children cannot have seen them before, and they can only be correctly read using knowledge of letter-sound correspondences. Hence, they provide a relatively pure measure of the child's knowledge of phonics. The assessment is administered by teachers and is criterion-referenced. When children do not meet the criterion, the Department for Education (2017) guidance highlights the need to evaluate the effectiveness of phonics provision across the whole school, as well as considering whether the child's attendance has been sufficiently high. Once ineffective or insufficient phonics teaching has been ruled out, there is then specific advice for identifying and supporting specific areas of difficulty. The screen is then repeated at the end of Year 2.

Detractors of the Phonics Check suggest that it leads to increased stress for students and teachers and leads to a narrowing of instructional focus. There are also reports of "teaching to the test", for example teaching children to read non-words (Walker, Bartlett, Betts, Sainsbury, & Worth, 2014). This indicates that some teachers do not understand the purpose of using nonwords. Despite these criticisms, the use of systematic phonics methods in conjunction with the Phonics Check does seem to be associated with better reading outcomes. Performance on the Phonics Check has improved every year since its implementation, with 81% of students now achieving the expected standard of performance (Department for Education, 2017). It is also worth noting that England's performance in the 2016 Progress in International Reading Literacy Study (PIRLS) was its highest since PIRLS

studies began, and more importantly, there were substantial increases in the performance of lower performing pupils (McGrane, Stiff, Baird, Lenkeit, & Hopfenbeck, 2017), though there may be other reasons for the improvements in PIRLS results.

What role can speech language pathologists play in early identification?

While further research into the most effective ways of implementing early intervention in different contexts is sorely needed, it is clear that successful early identification rests on the choice of sensitive and specific assessments with a clear link to instructional recommendations, as well as the appropriate choice of cut-off points for access to intervention, regular progress monitoring, and ongoing training and support (Arden et al., 2017; D. Fuchs & Fuchs, 2017; Gersten, Jayanthi, et al., 2017). SLPs have access to a rich knowledge base which is directly relevant to the early identification of reading difficulties, and can play a key role in this process. Below, we outline some of the ways in which SLPs can be involved (for further detail see Justice, 2006).

Firstly, SLPs should be part of a school-wide, multidisciplinary approach to RTI, and should be involved in decision-making from the beginning (Justice, 2006). Because SLPs are familiar with standardised tests, they can be involved in making recommendations on assessment choice, administering screening/benchmarking and progress assessment, and training others to administer assessments. In Kindergarten, assessments of phonological awareness, letter name and/or letter sound knowledge and vocabulary are appropriate. In Years 1 and 2, assessments of the ability to read simple nonwords and frequent regular and irregular words are suitable, and passage reading fluency may also be assessed (Gersten et al 2009). Where possible it is important to use more than one assessment of developing reading skills, as information from multiple assessments tends to be more sensitive than information from a single assessment (Gersten et al., 2009). Differences in performance between

assessments may also help highlight areas of strength or weakness, which is key information for informing intervention choices.

A gated assessment procedure may be more efficient and specific than a one-shot screening procedure (Compton et al., 2010; Fuchs, Fuchs & Compton, 2012). In a gated procedure, a single assessment or a set of brief assessments (such as word and nonword reading fluency) with relatively high cut-points may be used to determine which children are definitely not at risk of reading difficulties. Children who fall below the cut-point(s) at the first screening assessment can then have further, more detailed assessment of response to instruction. This may involve progress monitoring on assessments of letter-sound correspondence knowledge, and regular, irregular and nonword reading accuracy and fluency.

While some assessments come with suggested cut-points for access to intervention, generic guidelines may not be appropriate in every context (Gersten et al., 2009). It is crucial that schools and teachers keep records of whether cut-points are functioning as intended within their setting, and adjust them if necessary. This will be a process of trial and error, but flexibility is an essential part of RTI, which in its most effective form should be a system that responds to a child's needs (Fuchs et al., 2012).

Finally, ASHA guidelines clearly state that SLPs have a key role to play in early identification and in delivering literacy intervention at all tiers of RTI (ASHA, n.d.). However, outside the US (and even in some contexts within the US), speech-language pathologists may find it difficult to take any role in literacy identification or intervention, or may even be actively discouraged from doing so by funding structures or regulations. In view of what is known about the links between oral language skills and reading abilities (e.g. Catts et al., 2002; Snowling, 2014), this artificial separation is wasteful, and may violate evidence-based practices.

It is undeniably difficult for SLPs working under these conditions to integrate identification of literacy difficulties into their existing practice, but it is not impossible. Even if SLPs do not have any direct contact with a child's teacher, they are in a position to inform parents or guardians that a child may be at risk of developing reading difficulties, based on their knowledge of the child's case history and their performance on reading-relevant language assessments. SLPs have the skills to provide parents with information and to support them in approaching their child's school to request appropriate assessment and intervention. In some cases it may be possible for SLPs to carry out brief screening assessments themselves using existing resources. For example, most SLPs have access to phonological awareness assessment batteries which often contain tests of nonword reading. There are also researcher-designed assessments of reading freely available online (see for example the MOTif website, www.motif.org.au).

Finally, SLPs can adapt their intervention programmes to include written language components. For example, work on phonological awareness can be expanded to include work on letter-sound correspondence knowledge, which is more effective for improving reading than phonological awareness in isolation (Ehri et al., 2001). Work on vocabulary can, and indeed should, include exposure to the written forms of words, as this leads to better learning of both written forms and meaning (Parsons & Branagan, 2014; Ricketts, Bishop, & Nation, 2009; Ricketts, Dockrell, Patel, Charman, & Lindsay, 2015). Other language activities can be structured to include discussion of books or other written texts so that children are exposed to written as well as spoken language (e.g. websites, magazine articles).

What are the limitations of early identification?

Although there is evidence that children who have access to intervention in the early years of schooling will have better long-term outcomes than children who begin intervention later (e.g. Dion et al., 2010; Scanlon et al., 2005), children's progress needs to be monitored

throughout their schooling. In some cases (particularly in the case of relatively constrained skills such as letter-sound knowledge), early intervention may "innoculate" children and allow them to catch up to their peers, but early gains may fade over time (Tymms et al., 2017), and short-term intervention is unlikely to be enough for those with the greatest weaknesses in word reading ability or the highest levels of risk of difficulties. Such children are likely to need ongoing support as the demands of the curriculum change (McMaster, Fuchs, Fuchs, & Compton, 2005). In other words, early intervention should represent the *beginning* of the intervention and support process.

This is even more crucial because due to the multifaceted nature of reading, some forms of reading difficulty do not become apparent until later in schooling. We have focused on early identification of word reading difficulties, but it is important to note that reading comprehension difficulties may not become apparent until the later elementary years when children are increasingly expected to read independently and learn from what they read (Elwer et al., 2013; Hogan, Adlof, & Alonzo, 2014). Identification of reading comprehension difficulties can be particularly challenging when emerging in the absence of word reading difficulties (Cain & Oakhill, 2006; Colenbrander, Kohnen, Smith-Lock, & Nickels, 2016; Nation & Snowling, 1997). Thus, early identification of word reading difficulties is crucial – but monitoring of word reading, reading comprehension, and other literacy skills (e.g., spelling, writing) should continue throughout the school years. Such monitoring should be supported by strong classroom instruction, not only in phonics but also in oral vocabulary, morphological knowledge, reading comprehension strategies, and writing skills.

Conclusions

Early identification of reading difficulties is complex and challenging, but essential if we are to optimise outcomes for children with reading difficulties. In an ideal world, SLPs should work collaboratively alongside teachers to implement early identification. However,

even if this is not possible, SLPs can still play a vital role through the awareness of risk factors associated with the development of future reading difficulties, and by integrating written language into their assessment and intervention practices wherever possible. SLPs can also work closely with parents to ensure that parents and schools are aware of early risk factors.

Response to Intervention is a promising model of early identification and service delivery, but the jury is still out on the best way to implement it. More research into the specifics of early identification and RTI is sorely needed - but it is clear that the success of implementation relies on sufficient funding and support (Arden et al., 2017; D. Fuchs & Fuchs, 2017; Gersten, Jayanthi, et al., 2017). Early identification should be a priority for every school and education system, but it should not be the be-all and end-all of service delivery for children with reading difficulties – rather, it should be the first step in an ongoing cycle of monitoring and intervention which continues beyond the elementary years. Only then will children with reading difficulties have the chance to reach their full potential.

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