Intervention strategies to support pupils with difficulties in literacy during key stage 1

Review of Research

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Introduction

Education, and in particular literacy, is at the top of the current UK political agenda. Challenging targets have been set for primary school education and the National Literacy Strategy (NLS) has been developed to enable schools and children to meet these targets. However, no matter how effective the classroom programme, some children will find learning to read and write an uphill struggle. The importance of making particular provision for such children at an early stage has been acknowledged by the Literacy Task Force (1997) and by Beard in his review of research for the NLS (Beard, 1999). Beard points out that programmes developed to raise literacy standards both in the USA (Success for All, Slavin, 1996) and in Australia (Early Literacy Research Project (ELRP), Crevola and Hill, 1998) include a specific component addressing children with difficulties. For example, ELRP builds in 'three waves of teaching': the first wave being good classroom teaching; the second, one-to-one tuition for the bottom 20% in the second year of school, using the Reading Recovery programme (Clay, 1993) and; the third, for those 2% who fail to make satisfactory progress despite Reading Recovery, further, ongoing, specialist support. Evidence from the last two decades suggests that the English education system may have a particular cause for concern in its performance with the poorest readers. National trends in reading standards suggest that the poorest readers have performed worse over recent years and in international comparison England appears to be under performing for its poorest readers (Hurry, 1999).

The purpose of this review is to examine the research evidence in an attempt to build a picture of what should be included in any special provision made for children who have made a slow start in reading and writing at Key Stage 1. It is in the nature of the gap between research and practice that the evidence will not always be clear and consistent and in some cases there will be too little evidence to draw firm conclusions. However, it is nonetheless useful to identify those elements which are clear and non-controversial, those where there is divergent evidence and those about which we need to know more.

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Early intervention for reading

Summary
It is clear that children do not grow out of early problems with literacy. In the face of this evidence it seems irrational to withhold support at an early stage (Shaywitz et al, 1995).
Early intervention has been repeatedly shown to have a substantial impact on children's reading progress and we should clearly be addressing this area in any Key Stage 1 literacy programme.

Is early intervention necessary?

The first issue is whether early intervention is necessary. Up until the late 80's, children were normally offered additional help with reading problems only after they had been in school several years (typically at around age seven or eight, e.g. Gipps, Goss and Goldstein, 1987). The theoretical model of reading development being adopted was one of reading readiness. It was felt that many children may simply be late maturers and would grow out of their difficulties. Under such a model, early intervention is inappropriate. Longitudinal studies have now fairly conclusively demonstrated that children with difficulties early on tend to continue to have problems. Even before children can read there are signs that they may find the task difficult. Both in the UK (Bryant and Bradley, 1985) and in Sweden (Lundberg, Olofsson and Wall, 1980, 1984) have found a close relationship between phonological awareness in pre-schoolers and their subsequent ability to read after a year or two in school (correlation=.4). Once children start school, studies in both the UK and the USA have demonstrated that children's ability to identify letters in the first year of school is highly predictive of subsequent reading attainment (Tizard, Blatchford, Burke, Farquhar and Plewis, 1988; Bond and Dysktra, 1967; Shaywitz, Holford, Holahan et al,1995). More generally it has been found that children doing badly on reading comprehension in the first year of school are very likely to be poor readers three years on (Juel, 1988).

Can early intervention be effective?

There is now convincing evidence from three continents (UK, Australia/New Zealand and North America) that early intervention can make dramatic differences to children's reading, doubling the progress that they might otherwise have made and bringing them up to the level of their classmates. For example, Wasik and Slavin (1993) reviewed one-to-one tutoring for preventing early reading failure. They looked at sixteen separate studies of five different tutoring methods and found children's reading to be improved in nearly every case, often very substantially. Evaluations of one-to-one tutoring of 5, 6 and 7 year olds with reading difficulties in the UK, New Zealand and Australia have reported similar results (Sylva and Hurry, 1995; Bryant and Bradley, 1985; Hatcher, Hulme and Ellis, 1994; Rowe, 1989, 1995; Shanahan and Barr, 1995). The evidence for later remediation is less clear cut. Some research has concluded that remediation of reading problems in older children is largely ineffective (Carter, 1984; Juel, 1988; Kennedy, Birman and Demaline, 1986). Other studies, notably in the area of reading comprehension, have demonstrated success (e.g. Palinscar and Brown, 1984). We should be a little cautious in drawing firm conclusions about the effectiveness or otherwise of later intervention. Much of the research is not up to date. The type of additional instruction evaluated is very varied and includes group work (which as we shall see tends to be less effective) as well as one-to-one tutoring.

When we consider the potential impact of early reading problems it is not surprising that early intervention might be critical. Very quickly, poorer readers read less than their peers at school (Allington, 1984; Biemiller, 1977; Clay, 1967; Juel, 1988). As time goes by, and the better readers start to read for pleasure at home, the gap widens further (Juel, 1988). Those who read less are constrained both in their vocabulary development and in their world knowledge (Stanovich, 1986). Beyond the cognitive effects, children who experience repeated failure in reading may begin to approach learning in negative,

passive and inefficient ways (Stanovich, 1986; Johnston and Winograd, 1985). This will make it harder for them to use the skills they have and harder to teach.

How should we intervene, what are the critical elements?

So how should we proceed? A range of issues need to be considered in designing effective interventions. It has been argued that the essential core of any education is composed of three key elements, curriculum, pedagogy and assessment (Calfee and Hiebert, 1991). The **curriculum** defines the coverage of an educational programme. What should be included in early intervention programmes for children with reading problems? One central issue concerns the place of phonics instruction. Some argue that 'cracking the code' is the key task for the early reader. Perhaps phonics instruction is all that is required over and above the classroom programme. Others claim that frequent exposure to books is essential. If the selected children have reading problems, to what extent should writing be addressed? Issues around the curriculum are the most visible and the most controversial in terms of reading interventions. Despite this, **pedagogy**, the strategy employed to teach the curriculum, is also important. Do children with difficulties require additional one-to-one tuition, or are group sessions a viable option? This is a major issue for additional interventions because of the expense of individual tuition. Related to this, how important is teacher training to the effectiveness of an intervention and can classroom assistants substitute for teachers? How can we ensure that interventions are taught as intended? Through **assessment** we can establish what pupils know, and how they approach their work. Who should be selected for extra intervention and how? How important is the match between child's ability and task difficulty?

Curriculum

Summary

- *The most reliable curricula are those with a broad coverage, including not only a phonological element, which is critical, but also text reading, work on comprehension and on writing, particularly spelling. Narrower curricula with a phonological focus have sometimes been found effective, but the impact on children's reading tends to be smaller, and in a number of cases fails to generalise to children's reading at all.*

Breadth of the Curriculum

Choices about what to teach are essentially guided by the model of reading development adopted. Broadly, there is agreement that children must learn a range of skills in their first three years of formal reading instruction in order to make good progress (*eg Adams, 1990, Hurry, in press*). In particular they must:

- learn that print carries a message, and the rules of how it does so, often referred to as the concepts of print or emergent literacy.
- learn the relationship between letters and sounds.
- develop a basic sight vocabulary. No matter how good children's decoding skills, some high frequency words are phonically irregular and must be learnt.
- learn to make sense of what they read, monitoring their comprehension and making inferences.
- to comprehend well they need to be able to read rapidly and fluently.
- learn to express themselves in writing, which involves not only learning letter formation but also composition and spelling.

In addition to these cognitive dimensions, children are also developing images of themselves as learners and developing reading tastes. Whilst these aspects are less easily (and less frequently) assessed than cognitive skills there are numerous studies which demonstrate that they have a bearing on children's reading progress (*eg Majoribanks, 1979, Rowe, 1995*).

It is important to acknowledge this broad and relatively uncontested picture of what reading and writing are about. In some of the debates about appropriate forms of reading instruction it may appear that learning about phonics is the only dimension that is important, but this is misleading. Most writers acknowledge that the other elements of reading instruction are essential. For example, Stanovich, a leading proponent of the critical role of phonics has remarked 'there is no one who asserts that reading is merely a matter of decoding and word recognition' (Stanovich and Stanovich, 1995). This is borne out by the research evidence.

Summary
Phonics only add-on interventions have been found effective in some cases, both for poor readers and very poor readers. It seems to be important to include not only a reading but also a spelling element. However, other studies have found that this very focused intervention only produces specific effects, not generalising to children's reading or comprehension. Such targeted intervention may work (in which case it is likely to be cheap) but it is risky.

Phonics only interventions

There is by now an irrefutable accumulation of evidence pointing to the importance of phonics in learning to read. A prominent school of thought is that understanding the alphabetic principle is the critical early hurdle for the child learning to read. (Frith, 1985; Juel, 1991; Stanovich, 1986). This position implies the special importance of phonological intervention for all children. In addition, it has been argued that problems with phonological awareness are a particular source of difficulty for children with specific reading problems (sometimes referred to as dyslexia), strengthening the case for the importance of a phonics curriculum for children with difficulties (Stanovich, 1986; Frith, 1985; Jorm et al, 1983; Goswami and Bryant, 1990). There are a number of studies which show that good letter-sound decoding skills are the main advantage that good readers have over poor ones (Barron, 1981; Curtis, 1980; Gough, Juel and Roper-Schneider, 1983; Juel, 1988; Liberman and Shankweiler, 1985; Perfetti, 1985; Rozin and Glietman, 1977; Stanovich, 1980; Juel, Griffith and Gough, 1986). There is also overwhelming evidence that poor readers rely much more heavily on contextual cues than do good readers (see Stanovich, 1980 and 1986; Perfetti, 1995). This line of argument supports the importance of phonological intervention for children with reading difficulties, particularly for children with specific reading difficulties.

However, in practice, relatively few interventions focus solely on phonics. In their classic study, Bryant and Bradley (1985) argued that the most natural division of words into smaller sound units was that of onset and rime, ie 'b' + 'at'; 'r' + 'ing'. In developing children's awareness of the sounds within words the training they devised concentrated at the outset on alliteration and rhyme but moved towards more sophisticated phonic distinctions in response to the child's progress. Each child in the intervention group was given forty ten-minute, individual sessions, spread over two years. Two models of training were developed, one which only involved aural sound awareness training with little or no emphasis on the written modality and a second, which took the children one step further to matching these sounds with visual letter combinations using plastic letters to construct the words. The sound training alone was not clearly effective. The children who received the sound training with plastic letters made significantly more progress than all the control children, with reading and spelling ages at least ten months in excess of the control groups. They did particularly well in spelling (Bryant and Bradley, 1985). More recently, using a modify form of Bryant and Bradley's intervention Hurry and Sylva (1998) found that in the short term, phonological training had a specific impact on phonological skills but did not generalise to standardised reading tests. However, in the longer term the phonological training did have a broader impact, showing a significant impact on spelling more than four years after the end of the intervention.

A more recent study compared a rime analogy training for children with serious reading problems with an 'item-specific' training (Greaney, Tunmer and Chapman, 1997). These children were estimated to be in the bottom 2% and had already gone through Reading Recovery or something similar. The interventions involved three to four 30 minute sessions weekly for 11 weeks. The rime analogy involved systematic training in the use of rime spelling units (*eg* m_eat, h_eat_er). In the item-specific training children were given systematic training in the use of context cues to identify unfamiliar words. Both interventions involved word reading, spelling and sentence reading. Children given the rime analogy training made significantly greater progress than the item-specific group on word reading and various measures of sensitivity to rime but there was no significant difference between the groups on a prose reading test (the Neale).This tendency for phonological training to produce quite specific effects has been remarked

elsewhere (*eg* Lovett et al, 1994). In the UK, Hatcher and his colleagues (1994) compared children who received a broad (Reading Recovery style) intervention with those taught specific phonological skills. Both groups of children were taught for half an hour a day, over the same space of time (40 sessions spread over 20 weeks). The Reading Recovery style intervention was more effective than the phonological one at improving reading, though children who had received the phonological intervention had significantly improved their phonic skills. Despite having received individual tuition twice a week for half an hour over 40 weeks the phonological group were reading no better than children who had received only classroom instruction. Hatcher et al, (1994) found that phonology training on its own improved the phonological skills of children with reading difficulties, but this did not generalise to word or text reading. As mentioned above, Hurry and Sylva (1998) found that broader effects of phonological intervention took some time to become evident.

In their comparison of five one-to-one tutoring programmes Wasik and Slavin (1993) remarked that those programmes with the broader curriculum content had larger impact over a wider range of measures than those with a narrower, phonological focus. Pinnell and colleagues report similar results in their evaluation of Reading Recovery (Pinnell et al, 1994). Reading Recovery was compared to various alternative interventions, one of which, Direct Instruction Skills Plan (DISP) offered a narrower phonic skills based curriculum but children received the same amount of one-to-one tutoring. The DISP children were reading no better than the control group at the end of the intervention period. In a recent meta-analysis of phonological training studies Bus and van Ijzendoorn (1999) conclude that the evidence is overwhelming that this type of intervention is an important part of the reading curriculum in the first few years of school, though the effects were on average stronger on phonological measures than on reading measures. Nevertheless, they caution that although phonological skill is a substantial predictor of children's reading (explaining on average 6% of the variance) it is not the strongest single predictor. They found a stronger association between early storybook reading and later literacy (8% of the variance explained). In other words, other aspects of children's reading behaviour are central to their future progress. Bus and van Ijzendoorn also remark that programmes which included letter or reading and writing practice were more effective than purely metalinguistic games and exercises.

Though interventions which concentrate solely on phonic skills have been shown to be valuable, they run the risk of having too narrow and specific an effect. They are also relatively rare because, as discussed above, few would argue that children can be taught to read through phonological training alone. Even in the studies cited above, children were also exposed to a full literacy curriculum in the classroom. In their review of evaluations of recent British interventions for slow readers (many unpublished), Brooks and his colleagues conclude that most approaches which concentrated heavily on phonics showed little impact on reading (Brooks, Flanagan, Henkhuzens and Hutchinson, 1998). A case can be made for phonics programmes which offer something extra to the child with difficulties, as for example with THRASS (Brooks et al, 1998), a phonological intervention planned as an addition to the classroom programme (see also Snowling, 1996). However, the danger with add on programmes is that they fail to integrate with the classroom programme and do not give enough opportunity for children to practise their skills and use them in their reading and writing. For example, Felton and Brown (1990) argue the importance of early, systematic and sustained training in phoneme awareness and the alphabetic code but they also remark that children need a 'tremendous amount of practice' in order to develop fluency, only achieved through lots of reading rather than skills training (*eg* Smith, 1978;

Cunningham and Stanovich, 1991; Stanovich, 1986; Anderson, Wilson and Fielding, 1988). We know that reading comprehension relies on vocabulary and world knowledge (*eg* Stanovich, 1986; Stahl and Fairbanks, 1986). We know that comprehension is aided by familiarity with the language of books (*eg* Donaldson, 1993). These aspects of reading development require a broader curriculum.

Summary
The research evidence on these interventions first tells us that one-to-one tutoring in a broad reading curriculum can make very substantial differences to children's reading. All of these interventions include plenty of text reading, work on writing (with a particular focus on spelling) and some word level work, including explicit phonic analysis, though in Reading Recovery the phonics coverage is less systematic than in the other two examples.

Broad models of reading development

Whole language theorists such as Goodman (1986) and Smith (1979) proposed that laboured phonic decoding was the hallmark of the poor reader and that good readers concentrated on meaning and context. Phonic decoding was seen as a last resort in the reading process, as it was cumbersome and distracted the reader from the essential task of understanding the meaning of a passage. For Goodman and Smith, the mature reading process consisted of making minimal use of the writing on the page and maximal use of knowledge of the world and the active problem solving strategies of predicting and inferring. It is now very clear that Goodman and Smith were wrong in thinking that skilled readers pay so little attention to the details of print. Research on the reading process in the 1980s produced clear evidence that skilled readers attend closely to letters and words and in fact that it is the less skilled readers who rely more heavily on contextual clues to support their reading (Perfetti, 1985; Stanovich, 1986; Adams, 1990). It is no longer viable to argue that letter sound relationships are not important to reading.

However, despite this weakness of the whole language model, its emphasis on reading as a meaningful and purposeful activity makes intuitive sense and is a hallmark of the broader modern theories of reading development.

The best known and best evaluated of these broad interventions are Success for All (Slavin, Madden, Dolan and Wasik, 1996) and Reading Recovery (Clay, 1985).

Success for All (SFA)

Robert Slavin and his colleagues at John Hopkins University were approached to develop a programme to 'ensure the success of every child in schools serving large numbers of disadvantaged children' (Slavin et al, 1996). They produced a reading curriculum based on 'research and effective practices in beginning reading' rather than a theoretical model of reading. The curriculum covers a broad range of activities, graded by age, which encompass language development, comprehension and skills training. Teachers begin with reading children's literature, which they discuss with their pupils to develop listening and speaking skills, oral comprehension, vocabulary and a knowledge of story structure. In the second term of kindergarten a series of phonetically regular minibooks are introduced for reading in groups. Letters and letter sounds are also taught at this stage. As the children develop their reading skills they work together on texts discussing story structure, predicting, summarising and writing. Teachers provide direct instruction in reading comprehension skills, in strategies for self-monitoring and self-correction, integrating reading and writing.

Slavin and his colleagues believe that children with difficulties need the same reading curriculum as their peers but that they need more intensive instruction in this curriculum (one-to-one tutoring) at an early stage (Slavin et al, 1996). Thus SFA has a curriculum that is followed by every child in the class but in addition a tutorial element for children who are lagging behind. They take this position on the basis of research evidence. Teachers tend to have low expectations of low achieving children, which is associated with poor progress. Much specialist teaching for this group is very skills based and as a result, the children often come away thinking that the sole purpose of reading is to read

individual words accurately. Pupils in high reading ability groups consider comprehension as the critical factor (Slavin, Karweit and Madden, 1989; Allington, 1983). Thus, tutors support children in difficulty using the standard reading curriculum, working on the same stories and concepts being taught in the classroom but giving extra tutoring on meta-cognitive skills.

Tutoring aims to provide the children with the following reading strategies:

- mastering letters/sound relationships and using phonics to sound out unknown words;
- using pictures and context to figure out unknown words;
- using pictures and context to add meaningful information about what is happening in the story to promote comprehension;
- using comprehension monitoring strategies to improve comprehension.

The 20 minute daily tutoring sessions typically include:

- rereading familiar stories;
- reading new stories;
- quick drills of letter/sounds, phonetic words and sound blending: and
- writing (Slavin et al, 1996, p75 & 78).

Priority for tutoring is given to children in their second year of formal schooling (Year 1) but is offered to children in Years 2 and 3 where it is necessary and where resources permit.

Beyond the specific content of the tutorials, SFA emphasizes the importance of a well-designed classroom programme and consistency between this and any additional provision for poor readers. Slavin and his colleagues (1989) argue on the basis of available research that without such an integrated approach, children who receive additional support are in danger of missing important elements of the classroom programme and of being seen as no-one's responsibility.

SFA has been evaluated in a number of sites, comparing SFA schools with matched comparison schools. Large reading gains have been observed for pupils in the bottom 25% of their class (Wasik et al, 1993, effect sizes of SFA ranging from .55 to 2.37 in Year 1; see also Ross, Smith, Casey and Slavin, 1995).

Reading Recovery (RR)

Reading Recovery, developed in New Zealand by Marie Clay, has a well articulated theory of reading development and is based on this rather than directly on research as was the case with SFA. Clay (1991) proposes that there is a critical 'acquisition period', corresponding approximately to the first two years of formal schooling (p.318). During this period, children form a basic network of strategies 'conducive to literacy learning' which include searching, selecting and checking understanding of print. She writes that 'during the reading acquisition phase the novice reader is not only learning words or letter-sound relationships but is also learning how to use each of the sources of information in texts, how to link these to stored knowledge, and which strategic activities make 'reading' successful' (p.321). Children who successfully negotiate this stage become relatively independent readers aware of whether or not they understand what they read and able to draw on a range of key strategies to correct their own mistakes. The critical stage implied is one of an explicit orientation towards the reading process, that it is something that should make sense. The importance of specific skills, such as a good grasp of letter-sound correspondence, is recognised, but only as part of a

range of strategies being actively employed to draw meaning from print. Thus Clay's view of the early developmental stage of reading is much broader than that of theorists such as Frith (1985) and shares with the whole language tradition an emphasis on meaning. Clay argues that children experiencing problems during this stage run the risk of developing bad habits and a negative approach to reading. In the Reading Recovery lessons children are shown how to make use of all the information in a text. They are explicitly encouraged to self-monitor, to check their understandings using all the strategies available to them, to predict and to confirm. In other words they are shown how to develop and make use of meta-cognitive strategies in their reading. According to Clay, this allows them to become self-sustaining independent readers, still requiring adequate classroom instruction, but no longer in need of additional help except in a few cases where there are more deep-seated problems. Shanahan and Barr (1995) acutely observe that it is a basic premise of Reading Recovery that most children do not have reading problems because there is something wrong with them. Clay suggests that home or school factors are frequently responsible (1991).

In common with SFA, Reading Recovery foregrounds comprehension and the direct instruction of meta-cognitive reading strategies. Reading Recovery places less emphasis on explicit and systematic phonics instruction and greater emphasis on the 'authenticity' of the task. Phonic skills are addressed directly, but always in the context of the child's reading or the child's writing. For example, if a child misreads a word, or misspells it, the teacher may help the child analyse the word, letter by letter, using plastic letters, encouraging the child to hear the sounds and recognise their relationship with the letters and letter clusters. Children will not be asked to analyse phonological rules which have not emerged from their own behaviour. Reading Recovery does not address the classroom programme and is only offered to children after the first year of formal schooling, which follows logically from the notion of a critical period of acquisition.

The daily one-to-one tutorial sessions are approximately 30 minutes long and include the following components (not unlike SFA):

1. rereading two or more familiar books
2. rereading yesterday's new book and taking a running record
3. letter identification (plastic letters on a magnetic board) *and/or* word-making and breaking
4. writing a story (including hearing and recording sounds in words)
5. cut-up story to be rearranged
6. new book introduced
7. new book attempted (Clay, 1993).

Reading Recovery has been evaluated in a number of countries and has been consistently found to be effective, at least in the short term, with effects of a similar magnitude to SFA (effect sizes varying around 1.0: Wasik and Slavin, 1993; Pinnell, Lyons, DeFord, Bryk and Seltzer, 1994; Shananhan and Barr, 1995; Sylva and Hurry, 1995; Hurry and Sylva, 1998). In a small scale study, RR was found to have a greater impact on tutored pupils than SFA, though both programmes were effective and the size and design of the study make conclusions tentative (Ross et al, 1995).

Other interventions with a broad curriculum

Early Steps (Santa and Hoien, 1999) is an early one-to-one tutorial intervention, similar to Reading Recovery, that has been found effective compared to a small group intervention, particularly for the very poorest readers. In the evaluation study, tutorial sessions were given daily for 30 minutes from September to May of the following year. The curriculum content was very similar to RR and SFA, emphasising reading text of an appropriate level of difficulty, writing, largely with an emphasis on spelling, and word level work including explicit and systematic coverage of phonics.

Intervention and the classroom programme

Broad interventions tend to demand more of the pupil's working day than phonics only programmes. They cover more ground and to some extent they cover the same ground as the class teacher, though in greater depth. This makes if particularly important to consider the match between intervention and classroom.

Success for All and Reading Recovery differ in their relationship with the classroom programme. In SFA the connection between the classroom and the tutorial is explicitly addressed, in Reading Recovery it is not. It would be mistaken to assume that there is no connection between Reading Recovery and the classroom. The Reading Recovery teacher is a member of the school staff and will frequently be the expert in literacy. This will typically have an effect on the classroom programme. However, there is some evidence that lack of consistency between the classroom and Reading Recovery may undermine sustained effects of the intervention (Hurry and Sylva, 1998). In the current UK context of a National Literacy Strategy there is a clear opportunity to ensure some consistency between these different aspects of provision.

Another significant issue for these broad programmes is the need for systems management. In this respect they face more problems than a straightforward phonics add-on and this will be discussed in the section dealing with pedagogy.

Aspects of curriculum content

As we have seen these programmes have quite a similar curriculum content. What is the research evidence for the importance of the different elements?

Summary

- *Including a phonological element in the curriculum is essential, and that this should be explicit and systematic. This is a robust finding over a wide range of studies and this implies that the precise nature of the phonological element is not critical, though it should go beyond sound awareness training to involve some production on the part of the child.*
- *Demonstrating the importance of text reading specifically is difficult as interventions which include this element (all of those with a broad coverage) include a range of other features, of which text reading is only a part. Nonetheless, the fact that text reading is the critical element of broader curricula and that these curricula tend to produce larger reading gains makes a very strong case for the importance of working with books.*
- *The importance of writing has been less heavily researched. In early intervention the focus is particularly on spelling rather than composition. There is evidence that including a writing element is important, both for phonics only instruction and in the broader curricula. Precisely what form this element should take could benefit from more research. For example, what is the role of invented spelling? Should we teach whole word spelling?*
- *The value of repeated reading of familiar texts over the use of new texts is less secure.*

Summary
The research evidence regarding the importance of the inclusion of a phonics element is unequivocal. There is quite a lot of it and the results are consistently in favour of including explicit, systematic phonic instruction, preferably with a writing component. This is consistent with what we know about reading instruction generally. However, there is further evidence that phonics alone is not enough and that to help children with problems the curriculum needs to address other elements.

The place of phonics

There are four studies which help to clarify the significance of explicit phonics tuition within a broad curriculum.

Two comparative studies looking at children with reading difficulties found that adding explicit phonics tuition to a more broadly based reading programme significantly improved the effectiveness of the programme (Iversen and Tunmer, 1992; Hatcher et al, 1994). In the case of the Iversen and Tunmer study children receiving Reading Recovery made faster progress if given additional systematic phonics tuition. In the study carried out by Hatcher and his colleagues (previously cited) children receiving a broad reading curriculum (based on RR) plus phonology tuition made greater reading progress than those receiving either the reading curriculum or phonology alone.

In the third study, children in the bottom 20% of readers in Years 1 and 2 were offered three alternative literacy curricula. Each curriculum offered a broad coverage involving text reading in the context of shared, guided and independent reading, writing and language games. Direct Code (DC) also offered children a substantial amount of direct instruction in letter-sound correspondences and blending, practised in text with phonically controlled vocabulary. Embedded Code (EC) also dealt explicitly with phonemic awareness and spelling patterns and children worked in small groups on make and break activities with plastic letters and in writing. However, there was less emphasis on phonics than in the DC curriculum and it involved word breaking rather than word building and letter blending. Implicit Code (IC) offered a more traditional whole language curriculum, where the emphasis was on fostering a competence rather than on

learning to perform a skill. Children were taught on their allotted curriculum in class for 30 minutes daily and also received additional one-to-one or small group tutorials. The DC curriculum was more effective at improving the reading skills of at risk first and second graders than either embedded phonics instruction or whole language teaching; EC came second (Foorman, Francis, Fletcher, Schatschneider and Mehta, 1998).

In the fourth study, Year 1 children showing early signs of reading problems but with IQs in the normal range were randomly assigned to Code emphasis or a Context emphasis reading curriculum (Felton and Brown, 1990). They were taught the assigned curriculum in their classroom in groups of eight during the time allotted for reading instruction each morning over a period of two years. Children in the Code emphasis group made greater progress than those in the Context emphasis group. In this study both Code and Context curricula contained a phonics component involving direct instruction in phonetic decoding. The crucial difference was not in the presence or absence of phonics instruction, per se, but in the methods employed in teaching decoding skills and in the emphasis. In the Context curriculum, children were taught to first attempt to identify unknown words using context, then phonic information. They were taught auditory discrimination of beginning sounds but only by the end of the second grade the basic phonics elements. No attempt was made to teach sound blending. The major emphasis was on the acquisition of an extensive sight vocabulary. By contrast, the Code emphasis curriculum the phonics element covered a wider range, included blending, was introduced earlier and phonic decoding in reading was given a higher profile.

Taken together, these studies demonstrate that explicit and systematic phonics tuition is a key element in a broad curriculum of successful early intervention for children with reading difficulties. This is consistent with the literature on successful classroom literacy programmes (*eg Adams, 1990; Hurry, in press*). However, although explicit phonics instruction is valuable, as we have seen, it is not sufficient.

Despite the extensive research literature on the place of phonics there is very little work on other specific elements within a broad curriculum for children with reading difficulties. The key areas other than phonics included in successful programmes are:

- reading new texts;
- rereading texts;
- writing.

Summary
Reading text is the corner stone for any programme which addresses the importance of reading for meaning. There is little in the way of direct evidence of the specific effectiveness of reading text for young children with reading problems. However, arguably, the evidence described above, showing the superiority of a broad curriculum over a narrower phonics one, implies the importance of reading text. Narrower curricula often include writing, it is the text reading that they lack. Research does demonstrate that poor readers tend to be less aware of the importance of meaning than better readers. Teaching children vocabulary improves their comprehension and children learn far more vocabulary through their own reading than through direct instruction. Interpreting the evidence it seems fairly clear that reading meaningful texts in a tutorial situation improves the reading of young children with difficulties and that it is a key element of an effective curriculum.

Reading texts

Central to all literature based programs is the importance of having children spend considerable amounts of time engaged with books, reading and being read to, and responding to quality children's literature (Baumann and Ievy, 1997). It has been claimed that from being read to, children learn about the concepts of print, they learn more about the world, they begin to understand the language of books, their vocabulary is increased and they develop a desire to read (Butler, 1979; Harris and Sipay, 1975; Holdaway, 1979). Studies of pre-school children have consistently shown that being read to regularly is associated with language development and predicts good reading progress (Chomsky, 1979; Clark, 1976; Durkin, 1966; Teale, 1978; Wells, 1986). The reading of 'big books' or other shared reading in the first year or two of school has also been found to significantly improve children's reading and listening skills (Cohen, 1968; Elley, 1980, Elley and Mangubhai, 1983; Feitelson, Kita and Goldstein, 1986; Ricketts, 1982). Although there are no shortage of interpretations as to what aspect of the experience is helpful to children there is little in the way of evidence. Elley (1989) investigated the relationship between story reading and vocabulary development. He found that reading a story to seven year olds on three occasions over one week produced significant gains in vocabulary introduced by the book, compared to a control group.

Stahl and Fairbanks (1986) did a meta-analysis of the effects of vocabulary instruction. They selected 52 studies which met certain standards, including the use of a control group. They found that vocabulary instruction often had a significant effect on children's reading comprehension. The average effect size on comprehension of passages containing taught words was .97, a large effect. The effect on more general reading comprehension as assessed by standardised tests was smaller, .30, but still significant in many cases. These studies demonstrate empirically that improving vocabulary leads to improvements in reading comprehension. In other words the development of vocabulary is part of the reading process. However, by and large children learn new vocabulary not through the direct instruction from their teachers but through their own reading (Adams, 1990; Nagy and Anderson, 1984). Teachers spend very little time on direct vocabulary instruction (Durkin, 1979) but school age children learn a staggering 3,000 words or more per year (Adams, 1990). Nagy and Anderson (1984) found that the average fifth grader is likely to encounter between 16,000 and 24,000 unknown words per year in the course of reading. Which of these words are learnt is a function of how often they are encountered and whether or not the child is trying to make sense of the text. So we come back to importance of reading for meaning as we start to identify its significance within the process of children's reading development.

There is little research in this area which specifically focuses on young children with difficulties, however, models of reading which emphasise the importance of meaning must include text reading. For programmes such as SFA and Reading Recovery which aim to develop children's self-monitoring strategies, using context and comprehension both at the word and passage level text reading is essential.

Comprehension

Although encouraging children to make sure they understand what they are reading is a feature of most broad curricula, there is no research that I am aware of looking at the specific effects of comprehension instruction for this age group. (There is evidence of the effectiveness of comprehension training for older children, including those with reading problems, *eg* Rosenshine, Meister and Chapman, 1996; Palinscar and Brown, 1989; Guthrie, Van Meter, Hancock, Alao, Anderson and McCann, 1998). The focus in

reading comprehension instruction for young poor readers is generally on self-monitoring and on supporting their understanding through book introductions etc. but the specific skills, taught more directly to older children, such as summarising and prediction, are certainly a feature of SFA. It is possible that the relatively short text length encountered at this age makes more formal comprehension training unnecessary and inappropriate. Discussion of teacher read stories allows children to deal with more challenging texts and this strategy is employed in the classroom element of SFA.

Summary
On the whole, repeated reading seems to be a helpful strategy for children with reading difficulties, but the evidence is not consistent.

Repeated reading

The theory behind rereading texts is that the decoding becomes more automatic, allowing children to concentrate on comprehension and observing spelling patterns, etc. When children reread texts they do so more accurately and more fluently and they understand more of what they read. This has been found to be true both for poor readers and for readers in the normal range (Sindelar, Monda and O'Shea, 1990). However, Rashotte and Torgesen (1985) found that repeated reading as opposed to reading new texts does not significantly improve the way poor readers approach unfamiliar texts unless there is a substantially similar vocabulary. Nonetheless they see repeated reading as a way of increasing the amount that children read and they found it to be popular. Others have found rereading to improve word recognition, fluency and comprehension in unfamiliar passages (Herman, 1985; Samuels, 1985; Taylor , Wade and Yekovich, 1985; Dahl, 1979; Dowhower, 1987).

Summary
The evidence confirms that writing interventions which tend to be particularly focused on spelling improve the spelling, writing composition, word reading and comprehension of young children, both with and without difficulties. This is consistent with the experience with the phonics interventions discussed above which tend to be more effective where a writing or spelling element is included than where pupils are only given sound awareness training or reading alone. Writing, which involves production, complements reading which is a more receptive skill. It demands that children think about words from the letter upwards which perhaps explains why it has been observed that they demonstrate an alphabetic awareness in their writing before their reading (Frith, 1985).

Writing

Most successful interventions for poor readers, both with a narrow or a broad curriculum, include writing. The focus within the writing part of these interventions is mainly on spelling. Pam Czerniewska (1992) recounts an anecdote of a meeting with various language researchers to explore ways of assessing children's writing. Everyone agreed that children's ability to write in different ways for different purposes and in different social contexts was more important than their ability to spell. However, it was spelling that animated the meeting. At last there was something tangible. Perhaps similarly in reading interventions there is something very tangible about spelling, and it is more easily contained within a short time slot than other higher order aspects of writing.

There have been numerous studies across a wide age range which document the close relationship between reading and writing (Tierney and Shanahan, 1996). Loban (1963, 1964) concluded on the basis of a large longitudinal study across 12 grade levels that the relationship between reading and writing was 'so striking to be beyond question'.

A number of studies have looked at the impact of writing intervention on young children's reading. Clarke (1988) found that a year-long writing programme in which first grade pupils were encouraged to use invented spellings was superior to a writing programme that did not. These children not only wrote better as a result of the intervention but also made greater progress in their reading. Mason, McDaniel and Callaway (1974) found that encouraging first graders to write using words drawn from their reading books had a positive impact on their vocabulary and reading comprehension.

Berninger and colleagues (Berninger, Vaughan, Abbott, Brooks, Abbott, Rogan and Reed, 1998) argue that spelling problems, common in beginning writers, interfere with the development of compositional skills. This is similar to the argument that laboured word reading makes it difficult to understand what you are reading. Berninger and her colleagues (1998) were successful in improving the spelling of Year 2 children with

spelling problems, relative to similar children who received phonological and orthographic awareness training. They also found that spelling training led to improved word recognition and longer compositions. They evaluated different methods of improving children's spelling, all of which were more effective than awareness training and free composition alone and all of which included three elements: 1) letter-sound connections at the alphabetic level; 2) common word spelling patterns (rimes, *eg* rat bat, men hen; digraphs, *eg* sh, ch etc.; silent e rule; etc.) and 3) composition including the use of key words recorded in a personal dictionary. Uhry and Shepherd (1993) have found spelling training in First Year to produce larger gains on word and non-word reading compared to instruction on letters, words and text, though there were no significant effects on silent comprehension.

Summary
The evidence of any impact of teaching word recognition skills using flashcards is not yet convincing.

Word Recognition

In order to master the irregularity of English orthography it is necessary to recognise some whole words, especially those high frequency irregular words. Tan and Nicholson (1997) argued on the basis of LaBerge and Samuels's (1974) model of automatic information processing that children who find phonological decoding difficult should be supported in their comprehension by being trained on automatic word recognition skills. This is a similar argument to the importance of rereading familiar texts. They found that below-average readers aged between 7 and 10 years improved their passage comprehension, relative to controls when they were pre-trained on target words using flashcards. However, there is no evidence of whether or not such training would produce any measurable effects on a standardised measure of reading comprehension, that is, whether or not the effects would generalise. Other studies report negative effects of flashcard training (Fleisher, Jenkins and Pany, 1979).

Pedagogy

Summary

- *Increasing the amount of instructional time devoted to reading and writing is likely to produce reading gains. Children with reading problems will benefit from more time on this element of the curriculum than their peers and interventions should therefore be given outside the literacy hour and preferably during non-literacy classroom time.*
- *If the actual curriculum time is not increased, ensuring that children with difficulties are engaged with their work is likely to produce good results. There are a range of strategies involving adult supervision or work with peers that may be helpful.*
- *One-to-one intervention is more reliable than group programmes. There is very limited evidence of the effectiveness of group level intervention, though some examples have significantly improved children's reading progress.*
- *Teachers tend to produce larger reading gains in their pupils than classroom assistants and can deliver more flexible reading programmes.*
- *The need for training and ongoing professional development and the need to ensure that implementation faithfully reflects intervention guidelines require management systems. This is particularly true for the broader and more complex interventions. The fact that this area has rarely been specifically addressed in research does not detract form its importance. Reading Recovery has a clear and effective model for systems management.*

There are a range of factors, beyond the curriculum, which affect the efficacy of interventions

Learning time

Summary
Children with reading difficulties should benefit from additional curriculum time on reading instruction. The existing evidence suggests that children offered reading interventions are in danger of missing valuable classroom literacy instruction.

Although psychologists have produced theories of learning, there is no well-developed theory of instruction. However, certain important elements have been identified. Carroll (1963) has drawn attention to the importance of learning time. He proposes that mastery in a formal teaching context is a function of the ratio of the amount of time students actually spend on learning tasks (academic learning time) to the total amount of time they need. The time spent on learning is defined by the amount of time allowed for learning (the opportunity to learn) and the extent to which the student willingly and actively engages in the learning (perseverance). The amount of time needed to master a particular learning task is a function of the nature of the task, the student's ability and the quality of the teaching.

In general, associations have consistently been found between student progress and both the amount of time allocated by the teacher to the curriculum area and the proportion of that time that students spent in active learning (Creemers, 1994, especially a study by Marzano et al, 1987 on effective reading instruction). Studies of children with reading difficulties report the same kinds of relationships, both in terms of children's opportunity to learn and their perseverance (Leinhardt, 1981; Haynes and Jenkins, 1986; Simmons Fuchs, Fuchs, Mathes and Hodge, 1995; O'Sullivan, Ysseldyke, Christenson and Thurlow, 1990). This is an important issue for intervention programmes that withdraw children from the class as it has been found in America that

such 'pull-out' programmes often fail to increase the amount of time children with difficulties spend on reading activities, and they can even reduce the time available (Haynes et al, 1986; O'Sullivan et al, 1990; Slavin et al, 1989). Reading is such an important skill that it would seem advisable to ensure that children having difficulties early on receive more reading instruction than their peers, though this would have to be at the expense of some other curriculum area. As Carroll has suggested, the amount of time required to successfully master a particular skill is influenced by the ability of the pupil. Children who find reading difficult will need to spend more time on this element of their learning if they are to catch up with their peers.

Summary
It is not merely enough for curriculum time to be allotted to reading. Children with reading problems are likely to benefit from strategies that encourage them to use this time appropriately when they are not being directly supervised by the teacher. One option that has been found useful is peer tutoring.

Active engagement in learning

Merely receiving more reading instruction is not enough. To learn, children must be actively attending and involved. O'Sullivan and colleagues (1990) found that children who were in bottom groups in the class were less actively involved than their peers during classroom lessons. They also tended to be doing lower order tasks whilst their more able peers spent more time on writing and silent reading. This suggests that children who are behind in reading may need a small group or one-to-one instruction to make best use of their instructional time. O'Sullivan and colleagues (1990) found that the poor readers were more responsive and engaged in special education settings than in the mainstream classroom. In other words, one function of one-to-one or small group tutoring is simply to increase children's attention to what they are doing.

Peers and collaborative groups as a technique for increasing children's engagement

Other ways of increasing academic learning time have been explored. Children who do not read well or dislike reading may fail to be actively engaged in reading activities. Since most reading takes place when children are working on their own or in groups working independently from the teacher (*eg* Galton, 1999; Sylva, Hurry, Riley, Mirelman and Burrell, 1999) teachers may find it difficult to ensure that poor readers get the practice they need.

In order to maximise active learning time (perseverance), Mathes and her colleagues introduced a paired reading scheme in six First Year classrooms (First-Year PALS) (Mathes, Howard, Allen & Fuchs, 1998). More able readers were paired with less able readers and took on the role of 'Coach'. First-Year PALS is composed of two set routines: Sounds and Words, a code-based activity following principles of the model of Direct Instruction (Carnine, Silbert & Kameenui, 1997), and Partner Read-Aloud, where children read and re-read a book together and re-tell the story to each other. The children worked in pairs for 35 minutes per day for 16 weeks. At the end of this time the children's reading progress was compared to that made by similar children in six similar control classrooms. The children in both types of classroom, First-Year PALS and control, had spent around 11 hours per week on literacy activities, which included the paired reading in the experimental classrooms. The less able readers in the First-Year PALS classrooms made significantly greater gains in reading, measured on a range of tests, than their peers in the control group. Paired reading had some significant effects on the reading children of average ability but none for the more able group. This is as might be expected since the least able readers were always being 'coached' by the more able readers and were therefore spending time on activities appropriate to their reading level. The children involved in paired reading did not spend more time on literacy activities than the control children but presumably were more actively involved. The correct match of pupil to task was important.

The place of peers and independent reading behaviour in learning is a significant one. The average teacher spends the majority of her time interacting with pupils. In the ORACLE study, in 1976 teachers spent around 80% of their time relating directly to pupils. Thirty years later, in 1996, teachers spent 90% of their time working directly with their pupils (Galton, Hargreaves, Comber, Wall and Pell, 1999). Pupils however have a very different experience. In the same ORACLE classrooms in 1976 children were only interacting with the teacher for 15% of the time. Although this doubled to 30% in 1996, for the majority of the time children still worked independently of the teacher, either on their own or in groups (see also Tizard et al, 1988; Plewis and Veltman, 1997). There may have been some change in this situation since the introduction of the National Literacy Strategy but it is likely that children still do important learning in their independent work. Comparative studies in the area of reading that address the learning taking place when children work alone or in small groups not lead by the teacher are sparse. If children are spending 70% of their time in class away from their teachers, this element of their educational experience must not be neglected. SFA stresses the importance collaborative groups. Peer tutoring and paired reading are other strategies employed by teachers to increase children's motivation and engagement. However, as Brooks (1999) comments 'partners need to be given a clear model and approach to follow, otherwise both they and the tutees get confused' (p30).

Other aspects of provision

Time is not the only important factor. In Caroll's model of mastery learning, another important element in the equation is the quality of instruction. What is taught and how it is taught are also important. This is influenced by, amongst other things, the teaching context, one-to-one or group tuition, the level of teacher training and the care with which teachers are monitored and supported in their work.

Summary
The available evidence on the effectiveness of one-to-one tuition is very positive, but the curriculum content and pedagogy are also important.

One–to–one tuition

The argument has been made that interventions such as Reading Recovery and SFA are effective because of the amount of individual tuition involved rather than anything special about the curriculum or pedagogy. The research evidence does not support this argument.

In their evaluation of Reading Recovery, Pinnell and her colleagues directly addressed the importance of the time devoted to individual reading tuition (Pinnell et al, 1994). In this well designed, large scale study the effectiveness of Reading Recovery was compared with individual tuition by teachers using two other methods and Reading Recovery taught to groups of children. Four hundred and three children, all with reading difficulties, were randomly assigned to a control group or to one of the experimental groups, Reading Recovery, Reading Success, Direct Instruction Skills Plan or Reading and Writing Group. All the children in the experimental groups received exactly the same **amount** of time of extra help. The Reading Recovery children, the Reading Success children and the Reading and Writing Group were taught using a similar curriculum. However, the Reading Success teachers did not receive as extensive training, nor were they part of any on-going monitoring and support system. The Reading and Writing group were taught by fully trained Reading Recovery teachers, but in small groups, rather than individually. Teachers using the Direct Instruction Plan (DISP) were given a three day in-service course in a method which uses direct instruction to teach reading skills. The focus was on skills mastery, presenting the skills in a logical and sequential manner, application of skills in context and careful documentation by the teacher of the areas covered. The results showed that Reading Recovery was more effective than either of the other one-to-one methods, particularly DISP (as mentioned above), and also more

effective than the group tutorial sessions. It was the only one of the four methods where children made significantly more progress than control children in all of the four measures of reading and writing reported. Children given the same amount of one-to-one tuition on DISP did not make significantly greater progress than controls on any of the measures, nor did those children taught Reading Recovery in groups. This important study shows that 'just' intensive help will not teach poor readers to read.

Two other American studies, reviewed by Wasik and Slavin (1993), lead to the same conclusion, that intensive one-to-one tutoring alone is not sufficient to ensure reading success. Both these studies evaluated an intervention programme that, similar to Reading Recovery, was designed for six and seven year olds with reading difficulties. The programme, Prevention of Learning Disabilities, has a diagnostic screen, and an intervention, designed primarily to build perceptual skills, such as recognition, discrimination, copying, and recall. In a previous study Prevention of Learning Disabilities had been found to be effective (Ellison, 1968). However, in the two subsequent evaluations, where pupils were given one-to-one tutoring by their teacher for two 30 minute sessions weekly, only minimal effects on reading were found at the end of one year (Arnold et al, 1977; Mantzicopoulos et al, 1990). At the end of a second full year, one study found children to have made substantial gains in their reading, compared with control children (Arnold et al, 1977). The other study failed to find any marked effect even after two years (Mantzicopoulos et al, 1990). What is more, in both these studies comparison groups of children were monitored, who were also offered a similar amount of individual tuition using different methods and in neither study were these comparison groups found to have a substantial effect.

Summary
Group intervention tends to have been less successful than one-to-one, though some of this evidence is dated and the earlier American work is methodologically flawed. This is an area that would benefit from more research. If group intervention is adopted, previous research suggests that children will benefit from spending some of their day in groups of heterogeneous ability and not being stuck in 'red group' all day and every day.

Group tuition

In comparison to the generally positive effects associated with one-to-one tutoring, the evidence for the value of group interventions for children with reading difficulties is far less convincing. In America there is quite an extensive literature on the effectiveness of Chapter 1/Title 1 interventions, centrally funded support for disadvantaged and at risk children. The overwhelming majority of programmes developed through this funding involved group intervention and by and large they have failed to show evidence of being effective (Slavin et al, 1989), though there is a tendency for larger effects in the early years (Carter, 1984; Kennedy, Birman and Demaline, 1986). A possible explanation for the lack of success of group delivery may lie in the nature of the tuition offered. It has been consistently reported that lower ability groups tend to receive a different quality of instruction than that provided for high ability groups. The pace tends to be slower and the content more conceptually simplified, with a tightly structured curriculum concentrating on basic skills and leaving little room for independence, choice and discussion (Ireson and Hallam, 1999).

However, even with a proven curriculum, group intervention has been found ineffective. The Reading Recovery group intervention included in the evaluation of Reading Recovery carried out by Pinnell and colleagues (mentioned above) did not significantly raise children's reading levels relative to a control group, despite the fact that it was delivered by trained Reading Recovery teachers (Pinnell et al, 1994). There is an issue here that the group intervention may have suffered from being an adaptation of a programme designed for the one-to one context. However, as soon as a teacher must work with more than one child at a time the lesson content can no longer precisely address individual needs and the management of behaviour is likely to become more of an issue. For example, Moss and Reason (1998) describe group work with Year 1 children who had slow progress in literacy. They comment that despite the fact that

these small groups were intended to be homogeneous, differences between the children emerged early on which added to the difficulty of managing the group. Certain activities, such as writing, accentuated differences in pace and required careful attention to group management, not an issue in the one-to-one context. These factors can potentially reduce the effectiveness of group tuition.

It would be mistaken to suggest that no group interventions for young children with reading difficulties can be effective. Two of the successful interventions reviewed above did involve groups: the classroom based phonic code-emphasis approach (Brown and Felton, 1990) which involved groups of eight first graders and; the spelling intervention for second graders, evaluated by Berninger and colleagues (1998) which was taught to children in pairs. There are also studies documenting the effectiveness of particular programmes delivered to classes. For example, Blachman and colleagues (Blachman, Tangel, Ball, Black and McGraw, 1999) report on an effective phonological intervention delivered to kindergarten and first grade classes of low-income, inner-city children. However, there is much more evidence of the effectiveness of one-to-one intervention for children with problems. Nonetheless, there is considerable pressure to deliver interventions to groups rather than one-to-one because of resource issues. For example, in a study of five SFA schools, Venezky (1998) found that in at least four, some or all of the tutoring was done in small groups, which as he remarks is a serious deviation from the SFA plan.

Looking at grouping practices generally (not usually associated with an additional teacher) Lou Abrami, Spence, Poulson, Chambers and D'Appolonia, (1996) concluded that ability grouping was most effective where the teaching methods and instructional materials were specifically designed for group work. In general, within-class homogeneous grouping was found to be less effective for younger than for older children, for low ability than middle ability children (low ability children gained more in heterogeneous groups), for groups where only ability was considered in forming the groups and, for larger groups (6 or more members – the optimal group size was 3-4). Although not directly relevant to early interventions delivered to groups it is suggestive. It is also important to note that it is generally held that placing children in ability groups throughout the day is not advisable (Lou et al, 1996; Slavin et al, 1989; Barr and Dreeben, 1996; Ireson and Hallam, 1999). This implies that if early intervention is given to groups, these groups should be disbanded for other curriculum areas.

Training

Summary
The limited evidence that exists suggests that classroom assistants may find it difficult to deliver the breadth of curriculum required, and that to work effectively they need highly scripted material. There is a link between the complexity of the intervention programme and the training required to teach it effectively.

The majority of interventions reviewed here were delivered by teachers, for example, Reading Recovery, SFA and Early Steps. In their review of five one-to-one tutoring programmes, Wasik and Slavin (1993) found that those using certified teachers produced larger gains in children's reading than those using classroom assistants. The effect sizes for the programmes taught by classroom assistants or volunteers generally fell in the range of .20 to .75, while the programmes using certified teachers produced average effects from .55 to 2.37 by the end of first grade. Not surprisingly, the teacher-delivered and classroom assistant-delivered interventions also differed in curriculum. Those delivered by classroom assistants were highly structured, used well-scripted instructional materials and concentrated on phonic skills with little text reading. In contrast the teacher administered interventions relied on teachers' judgement, flexibility and knowledge of how children learn.

It is generally the case that the more scripted and the more skills based the intervention, the less training is required to deliver it. In a programme such as Reading Recovery, the child is encouraged to take the lead as much as possible and this means that there is little in

the way of a script. The teacher structures the activities so that they are not too difficult for the child and this is vital. If a task is beyond the child's reach, there is no option but to rely heavily on the teacher. The teacher will continually draw out the child's own knowledge and encourage the child to apply it correctly. Feedback is both positive and precise: 'I like the way you noticed that "boy" was not the right word. It made sense didn't it, but it didn't look right. "John starts with a "J" doesn't it, not a "b". What letter would you have expected to see if it hadn't been "boy"?". This kind of feedback is likely to improve the pupil's motivation, and allows the teacher to draw attention to teaching points and consolidate learning. However, to work in this way the teacher must, first, have a clear understanding of her pupil's skills, and secondly, a clear understanding of the ways in which these skills will help the child solve a given problem. This implies that the teacher has a deep understanding of the processes that children go through in learning to read. Without this understanding the teacher will neither be able to make a useful observation of the child's behaviour, nor direct the child helpfully. This understanding of the reading process is directly taught during the year-long training, along with strategies of assessment and instructional techniques to promote independent learning in the child. It is unlikely that this kind of programme could be successfully taught by someone with very little training. SFA, which is more scripted than Reading Recovery, requires less teacher training, though it still requires teachers rather than assistants to tutor children.

System management

Interventions with a broad curriculum and prescribed procedures for selection, delivery and exit strategies are complex to manage. Local pressures often pull teachers in the direction of changing the original programme. The very poorest readers are not selected, the intervention is delivered less frequently than originally designed, it is taught to groups rather than individuals or by assistants rather than fully trained teachers, children are taken off the programme too soon. If interventions are to retain their original character they require some kind of management and some provision for ongoing teacher training and ongoing professional development and support. For programmes such as SFA or Reading Recovery this is not a luxury but a necessity, in particular to retain the instructional quality.

Teaching style

Summary
Instruction in the skills of reading should include contextualised work. When teaching children with difficulties it is important to give them plenty of opportunity to practice their skills and to help them to generalise what they learn in one situation to novel situations.

The evidence in the section on curriculum points to the importance of embedding skills training in practice and more specifically phonic training in a broader curriculum. The same point has been made by many others, for example Adams (1990). This is true for children with or without reading problems (*eg* Byrne, 1998; Cunningham, 1990). It is perhaps particularly true for children with difficulties. These children often find it particularly hard to apply knowledge learnt in one context in other situations. For example, poor readers have been found to demonstrate phonological skill in one situation (spelling) but fail to make use of it in another (reading) (Bryant and Bradley, 1985). It has also been found that some adults with reading problems fail to make use of the strategies that they have available (Johnston, 1985). Further support for this, in a more general context, can be drawn from a study of children's self-regulation in problem solving (Brown and Ferrara, 1985). In this study, the researchers found that children classified as 'low ability' or 'remedial' found it harder to make use of the information they possessed to solve the problems than the other children. The difference between successful and unsuccessful students is not merely in the amount of knowledge they have, but in the way they use it. It is not enough to teach an appropriate curriculum. Teachers must also help children with reading difficulties generalise and practise the skills they are taught.

Assessment

Summary

- *The poorest readers should be selected for early intervention, preferably through a transparent assessment process.*
- *Ongoing assessment and monitoring is associated with successful programmes, allowing a closer match between child and programme.*
- *Assessment should be designed to inform the teaching decisions of a particular intervention.*

Uses of assessment

There are no studies which examine the importance of assessment per se for early reading interventions. However, assessment is a central feature of interventions that have been successfully implemented in schools, such as Success for All and Reading Recovery.

Summary
Initial assessment ideally should target the areas of children's reading addressed by the proposed intervention so that the results can inform teaching. Early intervention should normally be offered to the poorest readers in the class both because they are in the greatest need and as there is evidence that they will benefit the most. There may be pressures to select slightly better readers as there is a perception that they may make best use of scarce resources. Whilst it is true that they will probably make faster progress than the poorest readers they are also likely to be able to manage better in the classroom without additional help. Early intervention also has a useful role in identifying children with particularly severe problems. Those who fail to make progress will need more intensive and long-term provision.

Selecting children for intervention

The first purpose of assessment is for selection. Measures of reading skill for young children with reading difficulties cannot rely on word or text reading, as many of the target children will be virtually non-readers. In Reading Recovery, children who have been in school for around a year are selected for Reading Recovery in two stages. First, their teacher identifies them as being of concern in terms of their reading. After this the Reading Recovery teacher tests them on a battery of tests, specially designed for children at this level. This test battery includes letter identification, concepts about print, a word test, writing vocabulary, dictation and a test of reading, based on 'real' books, graded by level of difficulty. In the UK evaluation of Reading Recovery this was found to be the most sensitive of the measures used to assess children's reading ability at this age (including the British Ability Scale Word Reading test and the Neale Analysis of Reading) (Sylva and Hurry, 1995). Elements of this assessment pack have been used in many LEAs for some time to identify children at Key Stage 1 with special needs. This is not surprising as it compares very favourably with other diagnostic batteries suitable for use with this group of children in a school setting. It is simple to administer and takes about one hour altogether. The skills covered are of direct relevance to the teaching situation and allow teachers to identify children's grasp of skills important to their reading development, before they can actually read. The same test battery is used to guide decisions about when to finish a child's Reading Recovery tuition. In SFA, similarly, children are preliminarily identified by their class teacher for individual tuition and this choice is confirmed by formal assessment on an eight week cycle. The assessment is used to develop an individualised teaching plan for each pupil.

In Reading Recovery and in Sucess for All the poorest readers are selected for intervention and this seems logical. One of the arguments made in support of early intervention is that helps in the identification of children who have deep rooted problems which will require long term intervention (Clay, 1985; Velluntino, Scanlon, Sipay, Small, Chen, Pratt and Dencla, 1996). Some children may be slow to read because of insufficient exposure to books at home or because of some problem with their early schooling. Other children may have particular problems with cognitive functioning, in particular in the area of phonological awareness. Essentially this

characterises early intervention as a kind of dynamic assessment. For this purpose the poorest readers should be selected for intervention and the most reliable and rigorous way of doing this is through standardised assessment. There is also evidence from the UK evaluation of Reading Recovery that the poorest children benefit the most from intervention. Both in the short and the long term the impact of Reading Recovery was particularly apparent for the bottom 10% of readers in the class when compared with a similar control group (Hurry and Sylva, 1998). Indeed it was only for this group of the poorest readers that Reading Recovery showed a long term effect and the authors remarked that without intervention this lowest group of readers at six years old have a very bad prognosis.

Summary
One of the purposes of assessment is to ensure a good match between a child's ability and the tasks that they carry out in the intervention. Clearly, in one-to-one intervention a very close match can be achieved but this can only happen where appropriate ongoing assessment is implemented. All the evidence suggests that such ongoing monitoring is associated with successful programmes. In group intervention there will inevitably be a some spread of ability, making precise matching more difficult and also making ongoing assessment more challenging. Nonetheless, some measure of children's reading level is important. This is likely to raise particular problems for the management of heavily scripted group intervention.

The match between child and task

The second purpose of assessment is to ensure a good match between child and activity. Thus the assessment must be tailored to the intervention. If phonological skills are being taught, the value of instruction will be maximised if the child is being taught phonological connections that they do not already know but that are not beyond their ability to understand. Similarly, where children are reading texts these should be neither too easy nor too hard. In Reading Recovery children read texts which they can manage with between 90-95% accuracy. Below this level they will find comprehension difficult. Above this level there will be insufficient new learning. One-to-one tuition has an advantage here as teachers can precisely match the curriculum to the child's individual needs. Even in groups of four or five there can be considerable diversity between pupils, though homogeneous grouping will minimise this problem. Without appropriate assessment children's learning experiences will not be maximised and their independence will not be fostered. In reviewing classroom programmes Slavin and colleagues (1989) remark that close monitoring of children's learning is one of the hallmarks of successful teaching. Assessment is likely to be particularly important where children are being taught familiar rather than new curriculum areas. It is also increasingly critical with the greater diversity of the selected children. In this respect, early intervention has an advantage, as there is less diversity between pupils at this stage than higher up the school. For interventions which are heavily scripted, perhaps to make them suitable for delivery by classroom assistants rather than teachers, there may be little flexibility to adapt material to the child's level and this should reduce the effectiveness of the intervention. This may be less of a problem for early intervention than for later remediation.

Exit strategies

Thirdly, assessment is used for making decisions about taking children off intervention programmes. Many of the research studies reviewed have looked at fixed length programmes, but in practice schools wish to make maximal use of scarce resources, offering intensive intervention to children only while they are in the greatest need. Both Reading Recovery and SFA have ongoing assessment to enable teachers to make decisions about ending one-to-one tuition and in the case of SFA for re-grouping for class instruction.

Main Findings

Extracts of these findings have been included at the beginning of the relevant sections.

The argument was made in the Introduction that the evidence points to the sense of intervening early for children who have made a slow start in their reading. Their problems are not likely to go away and it has been demonstrated that schools can be successful in bringing their reading levels up towards the class average. The purpose of this review was to identify the key features of successful programmes in the hope of influencing the design of future provision. What emerges is that successful intervention is likely to be resource intensive.

The cost of resource intensive interventions means there is a constant pressure to adopt cheaper solutions. The message of this review is that if such cheaper solutions are adopted they should be very carefully monitored. Cheaper options become expensive if they fail to have an impact and there is plenty of evidence that early intervention is not infallible. Areas that might benefit from future targeted research are the effectiveness of classroom assistants at delivering early reading interventions of an appropriate model and the place of small group work in early intervention programmes.

In terms of curriculum coverage:

- The most reliable curricula are those with a broad coverage, including not only a phonological element, which is critical, but also text reading, work on comprehension and on writing, particularly spelling. Narrower curricula with a phonological focus have sometimes been found effective, but the impact on children's reading tends to be smaller, and in a number of cases fails to generalise to children's reading at all.

As always, there is a gap between what we know and what we need to know, which must be filled by current notions of good practice and interventions with a proven track record.

In terms of pedagogy there are several critical issues:

- Increasing the amount of instructional time devoted to reading and writing is likely to produce reading gains. Children with reading problems will benefit from more time on this element of the curriculum than their peers and interventions should therefore be given outside the literacy hour and preferably during non-literacy classroom time.

- If the actual curriculum time is not increased, ensuring that children with difficulties are engaged with their work is likely to produce good results. There are a range of strategies involving adult supervision or work with peers that may be helpful.

- One-to-one intervention is more reliable than group programmes. There is very limited evidence of the effectiveness of group level intervention, though some examples have significantly improved children's reading progress.

- Teachers tend to produce larger reading gains in their pupils than classroom assistants and can deliver more flexible reading programmes.

- The need for training and ongoing professional development and the need to ensure that implementation faithfully reflects intervention guidelines require management systems. This is particularly true for the broader and more complex interventions. The fact that this area has rarely been specifically addressed in research does not detract form its importance. Reading Recovery has a clear and effective model for systems management.

Finally, the main points emerging in the area of assessment are:

- The poorest readers should be selected for early intervention, preferably through a transparent assessment process.
- Ongoing assessment and monitoring is associated with successful programmes, allowing a closer match between child and programme.
- Assessment should be designed to inform the teaching decisions of a particular intervention.

This focus of this review is on the features of successful early intervention. However, whilst there is a hope that early intervention will make a sustained impact there is evidence that even after such intervention, children with problems will find reading challenging throughout the primary school. The early interventions reviewed here tend to have a diminishing effect as children stop receiving extra help and move up the school (Hurry and Sylva, 1998; Shanahan and Barr, 1995). It should be born in mind that some additional intervention at Key Stage 2 may be required, both for children who have been 'recovered' through early intervention and for those with the most severe problems who failed to respond sufficiently to early intervention.

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