

## Why morphemes are useful in primary school literacy

The English language uses units of meaning called morphemes to form words. The word 'magician' consists of two morphemes, the stem, 'magic', and a suffix, 'ian'. The spelling of 'magician' is not predictable from the way it sounds. The first 'a' sounds more like an 'i', while the ending sounds like 'shen' or 'shun'. But if we know that its spelling represents the morphemes 'magic' and 'ian', we can make sense of its spelling. This research project showed that literacy in primary schools can be helped by an awareness of how morphemes make words and are represented in spelling.

Primary school children of all ages have difficulties with spelling words when the spelling cannot be predicted from the way the word sounds.



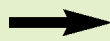
Teachers should be made aware of the role that morphemes play in these spelling difficulties and how they can be addressed.

Children's difficulties with the spelling of many words can be reduced by making them aware of the morphemes that compose the words.



There should be systematic teaching about morphemes and their role in spelling in primary school.

Making children more aware of morphemes has a positive effect on their vocabulary growth.



Teaching about morphemes is a good strategy to promote spelling and language development in the classroom.

# The research

This TLRP project addresses children's awareness of morphemes and the benefits that awareness of morphemes brings to children's language and literacy development. Morphemes are units of meaning that have a fixed spelling in English. There are two types of morphemes: stems (or base forms), which can often appear on their own, and affixes, which cannot appear on their own. Affixes are added to stems and influence the word's meaning. The word 'read', for example, has a single morpheme, which is its base form. We add 's' to 'read' when we are referring to the third person singular of this verb (he reads, she reads). We can also add the suffix 'er' to 'read'; 'reader' is a person who reads. We could add the suffix 'able' and have the adjective 'readable'. To this word we could add the prefix 'un' and have the word 'unreadable'. Children who have a good level of awareness of morphemes – both stems and affixes – also have a sound word attack strategy that can help them with spelling and in developing their vocabulary.

Morphemes give an indication of the meaning of words and also have a fixed spelling. Because morphemes are represented in spelling, many words that would seem to have an unpredictable or irregular spelling can actually be considered regular. This is the case of the word 'magician', which is written by adding 'ian' to 'magic', to form a person word, and of many other words. For example, the words 'confession' and 'magician' sound exactly the same in the end but are spelled differently. We argued that 'magician' is regular: is 'confession' irregular then? The answer is no: 'confession' is written by adding 'ion', a suffix used to form abstract nouns, to the word 'confess'. It is just as regular as 'magician'.

A survey of 7,377 primary school children in Years 5 and 6 in the County of Avon showed that children do not simply catch the spelling of words like 'magician' and 'electrician'. They cannot tell when word endings that sound the same – like 'emotion' and 'electrician' – should be spelled with 'ion' or 'ian'. Although they used 'ion' more often in the right than in the wrong place (e.g. in 'emotion' than in 'electrician'), they also used 'ion' more often than 'ian' when they should have used the suffix 'ian' (e.g. 'electrician' was spelled as 'electritrion' by 1,812 children whereas it was spelled correctly by only 785 children).

Working with several schools in Oxford, we analysed how children's awareness of morphemes relates to spelling and whether it is possible to improve children's spelling by boosting their awareness of morphemes. Later, with the participation of schools in the Hillingdon Cluster of Excellence, we also analysed whether it is possible to improve children's vocabulary and their word attack strategies for interpreting novel words by boosting their awareness of morphemes.

## The teaching of spelling

The project started by documenting whether and how teachers in Key Stage 2 use morphemes in teaching spelling. Analyses of 50 transcribed interviews with teachers about the teaching of spelling showed that teachers have explicit knowledge of some aspects of morphemes but not all. The word 'morpheme' was never spontaneously used, but most teachers mentioned prefixes and suffixes (82 per cent), and the use of 'ed' to change verbs to past tense (62 per cent). The 'ed' ending was nearly always associated with its meaning function. However, only 36 per cent of teachers (n=18) referred to the meaning of morphemes in other contexts. When they did, it was more likely to be in the context of a prefix like 'un' or 'pre' than of derivational suffixes such as 'ness' or 'ion'. The majority talked about morphemes in terms of visual features ('letter strings' or 'patterns'). However, the idea of fixed letter strings cannot help differentiate between the endings of words like 'confession' and 'magician' because these two words both contain fixed letter strings. Only a reference to meaning would help in this case.

Each teacher was also observed (and in 46 out of 50 cases videotaped) for one Literacy Hour. These observations confirmed that explicit mention of the meaning function of morphemes was rare. Only three observed events (out of 88) had some relationship to morphology and there was reference to meaning in only two of these, both in very specific contexts such as adding 's' to make a plural. Teachers' explicit knowledge and use of morphemes in teaching reflects the documentation of the National Literacy Strategy (NLS), and some aspects of morphemes that are most transparent.

The use of morphemes in teaching spelling has not been incorporated much into the NLS. Although a few programmes for teaching spelling, particularly some developed in the US, have suggested that it is important to teach children about morphemes, these programmes have neither produced methods that appealed to teachers and children nor the evidence to show that they are effective. It seems 'logical' that children should be taught about morphemes, but our project needed to produce the evidence required by the NLS, by showing that morphemes could be used effectively and acceptably in teaching without alienating children or their teachers.

### Baseline surveys

In order to see whether there is a real need to teach children about morphemes, different surveys were conducted with Key Stage 2 children. Earlier on we referred to a major survey carried out with more than 7,000 children in the County of Avon and documented their difficulty with words ending in 'ian' and 'ion'.

We carried out other surveys in Oxford and London, as part of this and of previous projects supported by the ESRC and MRC. These included spellings by more than 1,000 children of words with a variety of morphemes. A wide age range was

covered, from 6 to 11 years. The surveys all show that children do not reliably spell words that are not phonetically regular, even though they are morphemically regular. Even when the children know that certain letter strings are possible endings for words, such as 'ed' and 'ion', they often use these endings indiscriminately, in the right as well as in the wrong places. Explicit teaching would seem to be the answer to this problem.

### Intervention studies with children

In order to design an effective intervention programme, several small studies were carried out to test the characteristics of tasks that work.

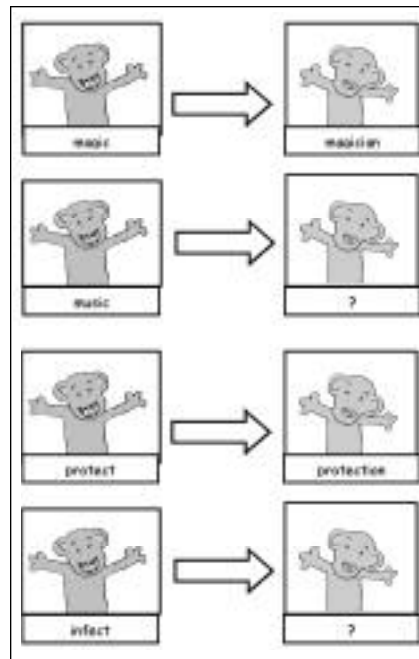


Figure 1: Example of an analogy game that helped with the distinction between 'ion' and 'ian'

In one study three groups of children received the same amount of practice in trying to learn the spelling of words ending in 'ion' and 'ian'. One group was never told that these endings are used to form different types of words. They were expected to learn the spelling by themselves, through practice. The second group had the opportunity to try to discover how the spelling of the word-endings worked. They were told the rule half-way through the exercises. A third group was told the rule about 'ian' and 'ion' suffixes at the start of the tasks and then had to try to use this information to work out correct spellings. The measures used at pre- and post-test involved spelling words as well as pseudo-words with 'ion' and 'ian' endings. Although the children in all three groups solved the same spelling tasks in the same order, only the two groups who were taught the rule explicitly showed consistently better performance than a comparison group who had worked on a different literacy task.

After these small studies, we designed a programme to teach children how to identify the morphemes that compose multi-morphemic words in order to analyse their meaning and spell them correctly. Our materials, which were delivered using IT

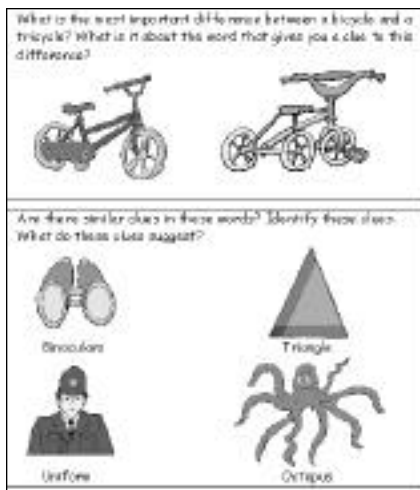


Figure 2: Helping children think about prefixes and how they can give a clue to meaning



Figure 3: Making connections between suffixes, prefixes and grammatical categories

and a game format, used a variety of operations, such as adding and subtracting morphemes, making analogies, counting morphemes, guessing the meaning of invented words made with real morphemes in non-existing combinations, and trying to discover the grammatical categories to which words with the same morphemes belonged. Teachers and pupils enjoyed these exercises. More than 1,000 children were involved at different stages of the research on the development and assessment of the programme. The programme is effective in improving children's spelling of words whose spelling cannot be predicted from the way they sound. It helps both children in the higher and lower ability groups. The programme also has positive effects on children's vocabulary and provides them with a word attack strategy that helps them analyse and interpret novel words. Its approach is compatible with current curriculum demands and extends them in a valuable way.

#### Intervention studies with teachers

To transform our research with children into practice, these techniques need to be adopted by teachers. We did this successfully during the course of this project. Teachers were invited to attend a 10-session course in literacy. This was offered as a Masters module or a stand-alone unit of professional development. There were three main aspects to the course: an introduction

## Major implications

Our research demonstrates that knowledge of morphemes can help children learning to spell English words, and that it is quite easy to promote this knowledge in pupils in an attractive and interesting way. We have also shown that for the most part teachers themselves are not explicitly aware of the importance of morphemes, but with the help of special courses can easily incorporate instruction about morphemes into their teaching of spelling. We have shown that:

- Schoolchildren on the whole have little awareness of the morphemic structure of words or of the crucial connection between morphemes and spelling → There is a strong case for introducing systematic teaching about morphemes into the school curriculum. This teaching should be sustained throughout primary school, including simpler examples for the work with younger pupils and more difficult ones for the work with older pupils.
- Existing attempts to teach children about morphemes and spelling within the NLS are scanty and those attempts that are made often do not deal with the meaning of the words or of their constituent morphemes. → Teachers can easily recognise how useful it is to teach the connection between meaning and spelling, and should be given the opportunity to reflect on it when planning how to teach children about morphemes and spelling.
- Classroom instruction about morphemes and spelling does not have to be boring and can be effective for both low- and high-achieving pupils. → Our classroom interventions provide a framework for the effective teaching of morphemes and spelling in schools.
- Teachers who were given the opportunity to reflect on the importance of morphemes in learning to spell were able and generally willing to incorporate instruction about morphemes into their spelling lessons, and did so with good effect. → The connection between morphemes and spelling should be incorporated also into the instruction that pre-service teachers are given about teaching literacy.

to relevant theories and research; the provision of the set of materials which we had created for our work with children; and involvement of teachers in the intervention process. Teachers found it challenging to learn about a range of new techniques and use them in their practice simultaneously but it was the co-ordination of theory and practice that proved effective in promoting their pupils' success.

There was little difficulty in increasing teachers' awareness of morphology. Of the 17 teachers for whom we had data at the beginning and the end of the course, only three defined a morpheme fairly accurately at the beginning but 16 out of 17 did so at the end. At the start of the module, teachers tended to consider phonological awareness as 'an essential foundation in the learning of reading and spelling', but did not refer to morphological awareness. At the end, they felt that teaching children about morphology also had important benefits for 7- to 11-year-olds. All but one of the teachers reported that the course had changed their approaches to teaching spelling. Most mentioned that they would teach more explicit morphology, making connections between spelling, grammar and meaning. The pupils (n=318) of teachers attending the course made significant gains in spelling compared to

children (346) in similar classrooms receiving standard instruction. The effect size of .50 was impressive for a whole-class intervention delivered by teachers who were learning a technique for the first time. The intervention is quite a focused and practical one, despite its conceptual base, and this probably contributed to its impact.

In the year following the course, one result clarified the aspect of our intervention that had affected the children's spelling. In the autumn term, a teacher who had been on the course did not have an opportunity to use the morphology materials. During this term, her new group of pupils made no greater gains in spelling than the other children in the same year group. During the spring term she used the morphology materials. Her class was compared with a parallel class receiving the same amount of additional spelling instruction but different materials. Her morphology group made significantly more progress. But additional curriculum time was important. Both these classes made significant spelling gains compared to a control class and to their own progress in the previous term. The ingredients for change in pupils' performance appear to be teacher knowledge and dedicated teacher time with the appropriate set of materials.

## Further information

Background information about teaching morphemes and spelling can be obtained from Nunes, T., Bryant, P., and Olsson, J. (2003) Learning morphological and phonological spelling rules: an intervention study. *Reading and Writing*, 7, 289–307.

A report of the work with teachers has been published: Hurry, J., Bryant, P., Curno, T., Nunes, T., Parker, M. and Pretzlik, U. (2005) Teaching and learning literacy. *Research Papers in Education*, 20 (1), 187–206.

Further journal articles reporting this research are currently in preparation. The project website (see below) provides further information on the results, and conference presentations on the base-line survey are available there.

A full description of the research and its results is provided in Nunes, T. and Bryant, P. (2006) *Improving Literacy through Teaching Morphemes* (London: Routledge).

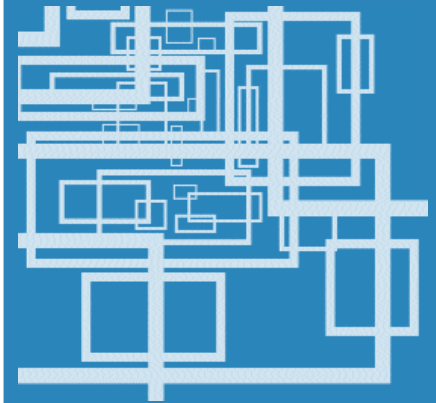
## The warrant

Confidence in our conclusions can be based on the robustness of the empirical procedures, which comply in full with the highest scientific standards and were informed by the long experience of all three members of the project team. The methods of teaching children about morphemes were scrupulously tested in a tightly controlled laboratory situation with carefully designed pre- and post-tests and intervention procedures before they were tried out in the classroom.

The lessons for the intervention studies were informed by the TLRP Phase II project *The Role of Awareness in the Teaching and Learning of Literacy and Numeracy*. They were with discussed with the project's Advisory Board, and with the teachers and head teachers in the participating schools.

All our conclusions are based on rigorous quantitative analysis, using inferential statistics (e.g. ANOVA and multiple regression). Our reported differences were not simply statistically significant, but also showed large effect sizes.

## Teaching and Learning Research Programme



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