Background to this research programme

The **ESRC-TLRP (Teaching and Learning Research Programme)** supported a three-year study about how children's awareness of morphemes influences their literacy. With their support, we developed the materials presented in the CD *Discovering the Secrets of Words*, which can be downloaded from this site using the link: http://www.education.ox.ac.uk/research/resgroup/cl/clr.php

We then used the activities that we had created to enhance children's awareness of morphemes as units of meaning that form words. We found that children did become more aware of morphemes after using these activities and that this new awareness led to significant improvements in their vocabulary, their ability to interpret novel words, and their spelling. This work is reported in the books *Improving Literacy by Teaching Morphemes* (Edited by T. Nunes and P. Bryant and published by Routledge) and *Children's Reading and Spelling. Beyond the First Steps* (T. Nunes and P. Bryant, Wiley-Blackwell).

The **Nuffield Foundation** took on board the challenge of supporting our research team to adapt this teaching programme for use with deaf children. The Foundation supported a two-year study where the programme was adapted by the inclusion of considerable amounts of material to increase deaf children's awareness of English syntax and its role in meaning and in morphology. The revised programme was evaluated and we found that the deaf children benefited in their word reading, reading comprehension and text writing skills through participation in this programme. A chapter describing this study will appear in 2010, *Writing a Language You Can't Hear* (by T. Nunes, D. Burman, D. Evans & D. Bell). A pre-print copy can be obtained from T. Nunes.

The **NDCS** (National Deaf Children's Society) is currently supporting further developments and dissemination of this teaching programme. Among the new developments are included supplementary teaching activities, new books for the children, and IT-games, designed especially for the children participating in this programme. Their support also allowed us to develop more materials for teachers, contained under the week by week objectives and a description of how it fits with the national curriculum in England.

Our site received over 6,100 hits in the past year, including visits by the children to play the IT games.

We are very grateful to the institutions that generously gave their financial support for the development and evaluation of this programme. We are also indebted to the schools, teachers, parents and children who participated in the programme. Their enthusiasm and feedback were invaluable. Without them, nothing would have been possible.

Theoretical framework

"Learning to read is easily identified as the most difficult challenge for deaf children in school" (Marschark & Harris, 1996, p. 296). It is easy for most people to think why learning English literacy is difficult for severely and profoundly deaf pupils: letters represent the sounds of the English language and severely and profoundly deaf pupils have difficulty in making the fine discriminations between

sounds required for learning literacy. This is known as the phonological route to literacy.

However, this is not the only challenge faced by severely and profound deaf pupils. English orthography represents sounds and also represents morphemes, which are the smallest units of meaning. For example, the word *magician* has two morphemes: *magic*, the stem, and *ian*, a suffix used to form 'person words'. The spelling of *magician* would be irregular if analysed in terms of letter-sound correspondences because the letter 'c' represents a sound normally represented by 'sh'. However, when morpheme representation is considered, *magician* is a regular word. In order to master the spelling of words that are regular when analysed into morphemes, we use the morphological route to literacy.

Research has shown that fluent readers do not read long words in a letter-by-letter fashion: they mentally analyse words into units larger than a letter but smaller than the word. They do this without even being aware of it: so, subtle research methods are required to demonstrate this use of morphemes in reading words. Leong (1989) carried out one of these studies. He used an ingenious design to show that children analyse into morphemes when recognising printed words. He showed hearing students in 4th, 5th and 6th grades words that contained different mixtures of upper and lower case letters: for example, "tractOR" or "tracTOR". He reasoned that if the boundary between the lower and upper case letters coincided with the way the children mentally analysed the words when reading, this mixing of letters would not interfere with reading; it would actually make it easier. However, if it did not coincide with the way the children approached the words, it would make reading more difficult. You should notice that in "tractOR" the boundary between lower and upper case letters coincides with the morphemes and in "tracTOR" it coincides with sequences of sounds that can be pronounced together. Leong found that children are faster at recognising "tractOR" than "tracTOR". He also found that, the more competent the readers, the greater the difference in favour of morphemic units.

In English, morphemes are written units that tend to remain constant even when their pronunciation changes (Venezky, 1995): think of how the pronunciation of "magic" changes when the suffix "ian" is added – but its written form is conserved. So morphemes should be useful for deaf pupils, who are good at using visual strategies in learning. But deaf children find morphemes difficult for two reasons. First, morphemes are connected to syntax in a very basic way. For example, the suffix "s" at the end of nouns marks the plural (e.g. cats, pupils, books) but, at the end of verbs, it marks the third person singular (e.g. writes, reads, eats). Unfortunately, deaf children's knowledge of English syntax and morphology is often not strong, because their knowledge of English is itself not very strong. Helen Bradmore (Bradmore, 2007), for example, documented that many deaf students in secondary school were not very proficient in using morphemes in reading comprehension. She asked them to read a sentence like "the apples grow on the tree" and choose which of two pictures best matched the sentence, one with a single apple on a tree or one with many apples on a tree. She found that the majority were at chance level in this task (i.e. they chose the right picture about 50% of the time, which means that they could be just guessing and had no way of choosing the right one by using the information from the suffix). The deaf students were weaker in this task than hearing students in primary school

who had the same level of ability in word reading, which leads to the conclusion that their difficulty was not due to failure to read the words but lack of knowledge about English morphology and syntax.

Our teaching materials were developed with two aims: (1) to increase deaf children's awareness of English syntax; and (2) to increase their awareness and knowledge of English morphemes.

The teaching of each conceptual unit starts with classroom activities which we have developed and which presented through Powerpoint. These tasks vary in nature and cognitive demands: for example, there are sentence completion tasks, sentence and picture matching, sentence production to represent events in pictures, and discrimination exercises in which the children choose the correct form to match a picture. Classroom teaching is followed by worksheets, reading books written to include the target structures or morphemes in context, board and computer games to be played at school or at home. Guided story writing for the practice of target sentence structures and morphemes are included by asking the children to re-tell a story they read from the perspective of a different character. The total teaching program is organized into a package of 10 weeks. This is only an estimate of how much time may be needed for going through the programme but the pace of teaching and number of hours used each week for the programme varies from one class to another. We suggested to the teachers that a minimum amount of time should be used on each occasion to allow the children to focus on the concepts and discuss them, before the children move to something else in their school day.

Evaluation of the effects of the programme

We assessed the children before and after their participation in the programme and compared them with an un-taught group using four different measures:

- their use of suffixes in spelling
- word reading
- reading comprehension
- writing skills.

The two groups were tested on the same measures at about the same time. The teachers of the children in the un-taught group continued to teach literacy in the same way they had done previously; they were given access to our programme materials later on.

Statistical analyses showed that the taught group, who participated in the programme, had significantly better results than the comparison group in all four measures. So, the teaching was effective in making the children aware of morphemes, as they were better at suffix spelling, and also had positive effects on the children's word reading, reading comprehension and writing skills.

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Further reading

Nunes, T., & Bryant, P. (2006). *Improving Literacy through Teaching Morphemes*. London: Routledge.