# Afasic Abstr. Ct Spring 2005

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Welcome to the Spring Edition of Afasic abstract. This edition reports the results of two research studies that consider the needs of children with language impairments and an innovative piece of action research that provides teachers and LSAs with the much needed resources to map the progress of children functioning below national curriculum levels. Please continue to write or e-mail us at j.dockrell@ioe.ac.uk or geoff.lindsay@warwick.ac.uk. We are particularly keen to hear from practitioners who are involved in innovative services.

All contributors can be contacted individually for further information. We hope you enjoy this edition.

### About the editors

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## Why children with language impairments experience difficulty with numeracy

Richard Cowan, Institute for Education and Chris Donlan, UCL

Contemporary research has produced several findings that challenge traditional views of cause and effect in child development. In the past, it was believed that children growing up in adverse circumstances were inevitably doomed to experience problems in later life and that early experiences had irreversible effects. Now we know that for most circumstances variability in outcomes is normal: some children will endure lasting consequences but others will emerge unscathed. Recognizing that outcomes are variable is one reason why psychologists now talk about risk factors and devote more effort to understanding differences between individuals that have adversities in common.

A previous article in Afasic Abstracts (Snowling, 2004) described how children with language impairments are at greater risk for low educational achievement and this seems largely to be due to difficulties with literacy. Interventions to prevent reading difficulties offer the prospect of reducing the risk. As children progress through school, literacy becomes more important: access to the curriculum depends more on literacy and so do methods of assessment such as public examinations.

Whether language impairment is a risk factor for maths difficulties is not so clear for several reasons. Firstly, the relation between language and maths is controversial. Although some would claim that much of our mastery of number depends on language, others believe that a facility with number develops relatively independently of language skills and that mathematical thinking does not depend on language (Butterworth, 1999).

Secondly, less is known about number than reading development but it seems there is no single arithmetical ability. Instead, there are a variety of arithmetical components, such as knowledge, skills, and understanding of principles. Some children are strong in their grasp of principles but weak in their knowledge and skills. Others show different patterns. What is responsible for this variability is not understood.

Thirdly, previous research on maths difficulties suggests that the chief factors are general ability and short-term memory characteristics. These short-term memory characteristics derive from systems that are responsible for the temporary storage and manipulation of information (Baddeley, 2003). Problems in one component of the memory system, the phonological loop, have been found both in children with maths difficulties and in children with language impairments. So differences in number development between children with language





impairments and typically developing children might be due to memory functioning rather than linguistic abilities.

Another factor that might be responsible for differences in number development is curriculum coverage. If children have not been taught to the same level then they can hardly be expected to show the same level of number development.

Our project, funded by the Nuffield Foundation, explored the number skills of 55 children with specific language impairment (SLI) attending special schools and language units in mainstream schools. We compared them with two groups of typically developing children recruited from the same schools or ones with similar catchment areas. One was a group of children matched in general ability, using a nonverbal intelligence test, and age (Age Match). Children in the SLI and Age Match groups were mostly 8 years old. The other comparison group was matched with the SLI group on language comprehension (Language Match). They were mostly 6 years old.

Our tasks sampled a range of skills involved in primary school number work and abilities believed to develop independently of instruction. They included

- Knowledge of the number word sequence, e.g. counting across decade, hundred, and thousand boundaries and counting backwards
- Reading and writing multidigit numbers, e.g. reading 3051 and writing in numerals 'six thousand and forty-two'
- Story problems such as 'Ann had some pencils. She lost 6. Now she has 3. How many did she have to begin with?'
- Basic calculations, i.e. adding and subtracting with single digit numbers
- Knowledge of simple number bonds, e.g. being able to answer 7 + 6 without calculating

- Place value, inferred from the ability to judge which of two numbers was larger, e.g. 4123 or 4213
- Seriation, the co-ordination of different sets, inferred from a nonverbal task requiring matching items of clothing to members of a family of squirrels
- Money, judging the value of coins with different denominations, e.g. comparing three 2p coins with two 5p coins
- Small number identification, saying how many objects had been briefly presented on a screen

We assessed the children's short-term memory functioning with tests from a recent battery (Pickering & Gathercole, 2001) and a test of their ability to repeat nonwords. The children's teachers told us the levels to which each child had been taught for each number skill. We assessed a different aspect of their language skills with a task that required production of past tenses of regular and irregular verbs.

The SLI group performed below the Age Match group on every number task. They were also less successful on every memory task and differed in curriculum coverage. Their performance was similar to the Language Match group on many of the number and memory tasks, but they were less successful than these younger children on the phonological loop test.

When memory functioning and instruction were taken into account, the differences between the SLI and Age Match groups remained on most tasks but the sizes of the differences were reduced. The SLI group showed the greatest deficits in knowledge of the number word sequence, reading and writing multidigit numbers, and story problems. The other tasks showed smaller differences and the difference disappeared on money and small number identification. This pattern seems to fit the idea that the

aspects of number that are most problematic for children with language impairment are those that involve language most.

Variation within each group was marked, particularly in the SLI group. Some children with SLI had number skills just like the average child in the Age Match group. Others resembled the much younger children in the Language Match group. Language skills did not explain the differences between children in the SLI group, but general ability and memory functioning did.

Our study is correlational and can only describe current reality. This means that we cannot draw positive conclusions about causes and we cannot rule out changes in the future. We found that children with SLI who show deficits in short-term memory functioning are more at risk for problems with number development but we cannot say why. It might be that memory functioning affects the ability to develop some number skills or that the development of number skills enhances performance of memory tasks. Methods for helping children develop number skills despite impairments in language and memory could be developed. Perhaps they already exist. There is still much to find out.

#### Contact

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### **Approaches to Intervention**

### *Dr. Victoria Joffe*, Department of Language and Communication Science, City University

There is a paucity of clinical research in the adolescent language impaired population. This reflects the shortage of speech and language therapy (SALT) provision with secondary school-age children. However, a significant number of secondary school-age students have profound language and communication impairments, which impede their access to the national curriculum. Few currently receive any SALT provision, despite strong evidence of the long-term impacts of speech, language and communication impairments into adolescence and adulthood.

The long term nature of language impairments and the rigorous demands of secondary school justify increasing SALT provision in this context. An effective way of enhancing language and communication in this group is needed which takes into account the limited SALT resources, age of the children and the pervasiveness of their impairments. An exploratory pilot intervention study was funded by AFASIC to explore whether intervention can assist this group. The intervention needed to be ecologically valid and cost effective. We achieved this by seeing most of the children in groups in their school environment. We compared two types of therapy: a narrative therapy approach and a vocabulary enrichment programme.

The narrative therapy programme incorporated the understanding and telling of stories with a focus on story structure, story description and inferential understanding. The vocabulary programme included the teaching of key concepts through word associations, word building and the use of the dictionary and thesaurus. Therapy materials were as far as possible drawn from topics in the national curriculum. We were interested to see first whether SALT intervention would improve children's language, and second, whether differences exist in outcomes following the two interventions.

A group of 54 12-year old secondary school-age children with language and communication impairments took part in the study. The children were referred from an outer London borough SALT Service or from SENCO's from participating schools and were not receiving SALT. The children presented with severe and complex difficulties in language and communication; consistently scoring at or below 1.5 standard deviations below the mean on a range of receptive and expressive language assessments.

The therapy was conducted by SALT students from City University and consisted of a total of 12 sessions of approximately 50 minutes each. It took place over a six-week period with two sessions per week. The children were randomly assigned to one of the two therapy groups. The sizes of the groups ranged from one to five and were matched across the treatments.

A detailed pre and post therapy assessment battery was administered exploring receptive and expressive language abilities, literacy and narrative skills. The students were also given a questionnaire after the therapy to explore their views on its success. No therapist assessed and administered therapy to the same children. There was an interval of approximately four months between pre and post assessment.

When the groups were combined, significant

improvements pre- to post-therapy were found in receptive vocabulary, recalling sentences, naming and idiomatic comprehension. There was a trend for the vocabulary group to show improvement on receptive grammar and recalling sentences whereas a trend in the narrative group was to show change in receptive vocabulary and idiomatic comprehension. Neither group improved significantly on the narrative measures.

Thus over a period of four months, secondary school-age children showed improvements on certain language measures. This demonstrates that therapy can benefit these children. No significant difference was found between the treatment groups.

We have to be cautious in explaining the observed improvements in the absence of a control group, as we cannot be certain that it is as a result of the therapy. However in light of the pervasiveness and severity of the language impairments and the frequently reported small changes in test scores in this age group, it is pleasing to note this improvement across language measures over a relatively short period of time. Certainly these positive results are encouraging and necessitate that we undertake further studies to explore the potential benefits of therapy with this group.

We also gained some interesting comments from the children themselves when asked about their views on the therapy. Seventy-four percent of children stated that the therapy helped them with talking and understanding. Fifty-six percent of them felt it helped with their reading and writing, 54% thought it helped them in the classroom and in getting on with friends and 33% said it helped them make



new friends. A total of 41% felt they would like to have more of these lessons. Thus the majority of children reported some important benefits from the 12session therapy programme.

A curiosity of the results was that neither group improved significantly on the narrative measures. The sensitivity of the measures used to identify change in performance may explain this, and is another important consideration. It may be the case that traditional standardised assessments are too global and therefore not sensitive enough to pick up more subtle changes. It may be necessary to add more non-standardised measures to the test battery that more directly reflect the therapy given, for example a measure of story structure.

This study shows that adolescents with language and communication impairments can show improvements in their linguistic abilities after relatively short periods of therapy. This is encouraging and poses questions about how resources can best be used to meet the needs of this population. To echo Larson et al. (1993), it is our moral, professional and ethical obligation to do so.

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### **Practitioners' Corner**

In this section the views of different practitioners who work with children who have language and communication difficulties are presented. By considering the views of different professional groups and practitioners working in different contexts we hope to highlight the range of strengths and needs the children experience. If you would like to express your views here please contact one of the editors.

Like so many good initiatives, this project began with a chance meeting between a speech and language therapist and teacher over a jammed photocopier. We were both working with class teachers to support the inclusion of pupils with severe and complex language and communication difficulties in mainstream schools. We found the work challenging and rewarding but were increasingly concerned about the regularity with which similar problems arose. Class teachers had difficulty identifying developmentally appropriate targets for pupils functioning significantly below the average National Curriculum level and the relationship between teachers and TAs was sometimes strained because of pupils' apparent lack of progress. Committed teachers often felt pessimistic about their ability to plan for the successful inclusion of these pupils. We also had concerns about the amount of duplication that occurred.

Initial discussions on an effective multi agency approach to these issues identified the need for a flexible planning structure which linked developmental information to activities and resources and, very importantly, built upon what was already happening within schools. We drew up an action plan with National Curriculum P Scales as our starting point and a colleague (Neil Thompson) with particular interest and skills in IT developed a database to store information.

Our work focussed on three areas: Firstly we broke down the P level descriptors and began to collect banks of strategies and activities for each step. Secondly, we developed planning/monitoring proformas based on Pivats and B squared materials. Thirdly, we identified resources and materials suitable for the activities and made clear lists of appropriate resources for different P levels. These areas provided a flexible menu to build on procedures that existed in individual schools. Teachers and TAs picked from what was on offer to support their planning, monitoring and teaching.

The project has been very well received and has blossomed beyond our expectations. On a recently circulated evaluation form, one head teacher wrote:

'It has provided staff with a clear structure from which to plan suitable targets/activities for the pupil at our school. It has given us clear guidance to include the child in the National Curriculum and has enabled us to carefully chart individual progress......this has made a tremendous impact on how the LSA and teacher have been able to work.'

The project has greatly reduced duplication of work although our database has only restricted access, we have recently secured funding from a local charity to develop a website. This should make the material accessible to all – at the flick of a switch!

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