



OSCCI NEWSLETTER



Oxford Study of Children's Communication Impairments, Department of Experimental Psychology, University of Oxford, OX1 3UD
<http://www.psy.ox.ac.uk>

Brain Imaging in Specific Language Impairment (SLI)

This year we completed data collection for a study using brain imaging in children with SLI and their families. Magnetic Resonance Imaging (MRI) scans were collected for 68 individuals from 19 families – this represents a huge commitment from all our families, often taking the best part of a day out of their weekends to help us out. Many, many thanks to all those families involved.

Typically, the overall brain structure of people with SLI looks very normal. When we average across a whole group, we see some subtle differences in the proportions of grey matter in frontal regions for those with SLI and controls.



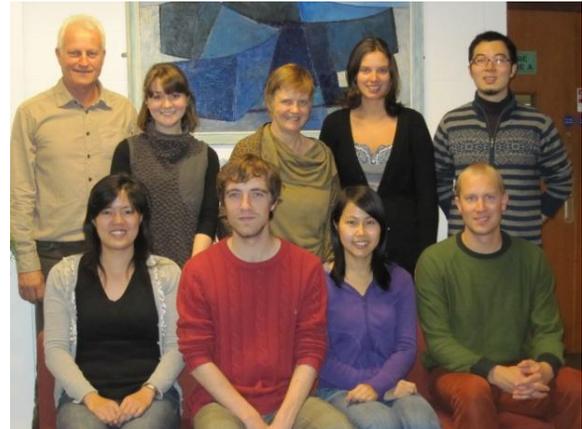
However, when we look at brain function, we find some regions are less active than in other people, specifically when doing language tasks. People were presented with a spoken description of a word, for example, 'purring house pet' or 'long yellow fruit'. In response to this, they were asked to think of the described word – 'cat' or 'banana'. Children with SLI showed less activation in a left-frontal area of the brain known as Broca's area. This area is specifically associated with speech production.

This is an exciting finding, suggesting that the brain's response to speech is different in children with SLI. We cannot yet tell whether this is a cause or consequence of having a language disorder, but it helps us home in on particular brain regions that may function differently. Over the next year we will explore this result further.



Kate, Dorothy, Mervyn and Nic look at the MRI data

OSCCI Team - 2009



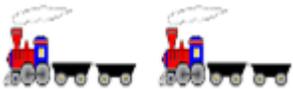
Chinese Twin Study

Graduate students Bonnie Chow and Simpson Wong are investigating how heredity and environment influence language and reading development in Chinese as a mother tongue and English as a second language. This study started in 2007, and over 350 pairs of Chinese twins aged 3 to 11 have been recruited. This summer, the twins were seen again one year after the initial testing. Each of them was administered a variety of language and reading tasks in both Chinese and English. It has been a great pleasure to see some familiar faces and observe their development. This year we will be busy analysing the results.

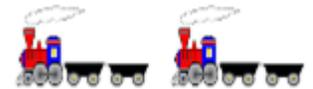
The development of twins has also drawn the media's attention. TVB, the most popular television broadcasting company in Hong Kong, is producing a programme on twins, and they filmed some of the last day of testing.



While in China, Bonnie and Simpson visited the Chimelong Safari Park where they saw the only twin koala bears in the world!



Can we train language comprehension?



Imagine how hard you would find it if you just understood individual words in a sentence but could not reliably put them together to get the right meaning. We know that children with SLI are less efficient than their age-matched peers in understanding the meaning of sentences. In a previous study we showed that their understanding is particularly shaky when interpreting sentences where word order is important, such as “the ball is above the duck”. Clearly, this sort of difficulty will have an adverse effect on learning in classrooms, which relies heavily on understanding what teachers say.

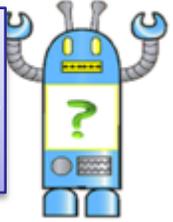
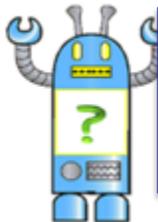
To take forward this line of study, Dorothy Bishop and Julie Hsu are planning a new project to examine sentence comprehension in children with SLI, with the goal of identifying factors that help or hinder fluent comprehension. We are now recruiting schools to take part in this study. Our goal is to recruit 50 typically-developing children and 50

children with SLI . We plan to see children over several sessions in schools to see if we can train their understanding using computerised comprehension games. Children who take part in this study will receive language assessments, learn to understand sentences and new words, and do other tasks to test their ability to learn when no language is involved.



Mervyn, Anneka, Julie, and Georgina will be busy visiting schools early next year.

We are looking for typically-developing children aged 4-6 years and children with SLI aged 8-10 years to take part in this study. If you or your school is willing to take part, please do get in touch for further information. Your participation will contribute greatly to our understanding of language impairment and future development of intervention.



Working memory and learning

Pascale Engel joined us this April on an ESRC postdoctoral fellowship. Pascale is from Luxembourg where it is common for people to speak several languages, and in her thesis she investigated children’s language skills in their native tongue and in a second language. She was also able to compare children who came from very different social backgrounds: from rich and poor backgrounds in Brazil and in Europe. Her interest is in how environmental and cognitive factors interact to influence children’s learning.

Pascale’s studies have focused on working memory, and the role it plays in children’s

learning. Working memory is a mental workspace in which information can be stored while complex cognitive activities are carried out. She has found that assessments of working memory are not much affected by a child’s social background. Furthermore, working memory capacities play a key role in children’s learning over the school years. Assessments of working memory in kindergarten could predict children’s learning up to 3 years later. Taken together this research shows that working memory tasks are a promising tool to separate environmental and intrinsic factors that affect a child’s learning progress.

A big THANK YOU to all those families, school staff and other professionals who have helped with our research. Our research would not be possible without you!



Left is for language?



Most people in the general population process language in the left-hemisphere of their brains. In OSCCI, we've been testing this using a technique called Transcranial Doppler Ultrasonography. This involves using ultrasound, the same as would be used for monitoring a baby in the womb, to examine the blood flow to the left and right sides of the brain during language tasks. We have done a lot of work with adults but are very interested in looking at the pattern of blood flow in children, especially those who have difficulties with language. We have conducted several studies using this method and have found it extremely interesting.



In last year's newsletter we described a study by Andrew Whitehouse which showed that adults with persistent language difficulties tended to show less left-lateralisation than other people when doing language tasks. In contrast, people whose language problems had resolved, and those with autism, had normal left-sided activity during language tasks. We thought it would be of interest to look at adults with milder problems, namely university students with a diagnosis of dyslexia. MSc student Sarah Illingworth studied language laterality in 30 adults with dyslexia and 30 controls. She found that most people in the study had left-sided language activation, but this was less strong for the people with dyslexia. This study is now published in the journal *Brain and Language*, and can be downloaded from our website.

We were pleased to find we could use the Doppler method with 4-year-old children in a study following up late talkers. We hope to give you some results in our 2010 Newsletter. Watch this space!



The tasks we used in the late talker study required children to tell a short story they had seen on video. We now want to see whether we can get good results if we give children a task where they only have to listen to stories, which would make the task more useful with shy children and those with speech problems.



Nic Badcock and medical student Abigail Nye have been trying out various tasks with adults, and have developed a listening task which gives good results. The next step will be to try the task with toddlers. Nic has also been working hard to streamline the analysis of our results, which will allow us to look more closely at how blood flow to each side of the brain changes second by second.

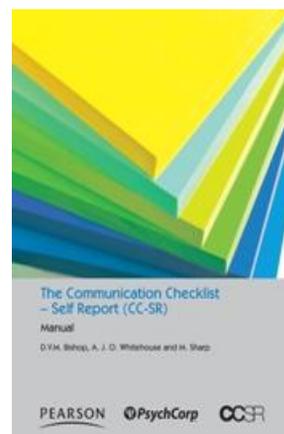
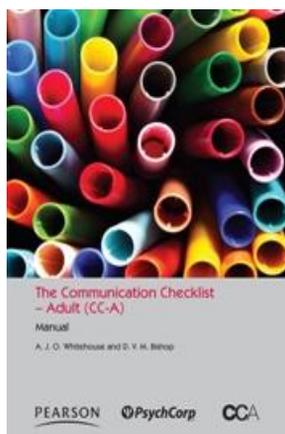


Margriet Groen has also been using the Doppler system, this time to study 25 children with Down syndrome as well as about 100 typically-developing children aged between 4 and 16 years. She found that most typically-developing children used the left side of their brain for language from as young as 4 years of age. Among the children with Down syndrome fewer people showed this pattern. Individual children with Down syndrome were more variable, activating one side of the brain on some trials of the language task and the other side on other trials. This might indicate that the brains of people with Down syndrome are less specialized for language, or that they activate the language-system less reliably. The degree to which children with Down syndrome used the left side of the brain for language was not related to their language ability.



New Communication Assessments

The Children's Communication Checklist – 2 (CCC-2) has proved to be a popular way of assessing communication difficulties using parent or teacher report. This allows us to find out about aspects of communication that can be difficult to assess using conventional language tests – such as the difficulties with non-literal language that Peter Collins is investigating (see below). This year saw publication of two new checklists derived from the CCC-2: the Communication Checklist for Adults, which uses reports by family, friends or carers to gain information about communication skills of adults, and the Communication Checklist – Self-Report (CC-SR), which allows young people and adults to report on their own strengths and limitations in communication. Both instruments are published by Pearson Assessment.



Understanding non-literal language

People often mean more than they say. If someone says to you, 'It's a fine day for a picnic' when it's raining, you'd usually be right to guess that they actually mean 'What awful weather for a picnic!' To understand this kind of language, you need to know more than the meaning of the words and how they combine to form a sentence. You also need to know how to use contexts and these words to work out what the speaker really means. Graduate student Peter Collins has been investigating how we learn to work out speakers' meanings and whether people with autistic spectrum disorders find it difficult to do so. So far, he has worked with 7-year-olds, 8-year-olds and adults with autistic spectrum disorders to see how these groups understand language like the following example:



The dog loves cake.
Mary: Has someone just eaten my cake?
Tom: The dog looks very happy!



Peter has been investigating at what stage children learn that Tom means something like, 'Perhaps the dog has eaten the cake.' Next he plans to look at how we understand metaphors and irony, and whether we understand them in the same way. Specifically, he will study how much we have to call on our understanding of what other people think, believe and intend, in interpreting what they say.



Dr Pascale Engel has joined us for one year on an ESRC postdoctoral fellowship.

Hello and welcome to...



Dr Julie Hsu arrived in January from the University of Iowa.

Anneka Holden joined us in August as a Research Assistant and Co-ordinator.



Dr Margriet Groen moved back to the Netherlands to continue her research at the University of Nijmegen.



Goodbye and best wishes



Dr Jessie Ricketts completed her doctorate last year and joined the Institute of Education to continue with literacy research.



Dr Andrew Whitehouse has returned to Australia to work at the Telethon Institute for Child Health Research.

to ... *Noel Orpen* will be leaving her role as Research Co-ordinator at the end of this year. We wish her the very best in her retirement.



For further information: please consult our website, which has details of our research and publications: <http://www.psy.ox.ac.uk/OSCCI>